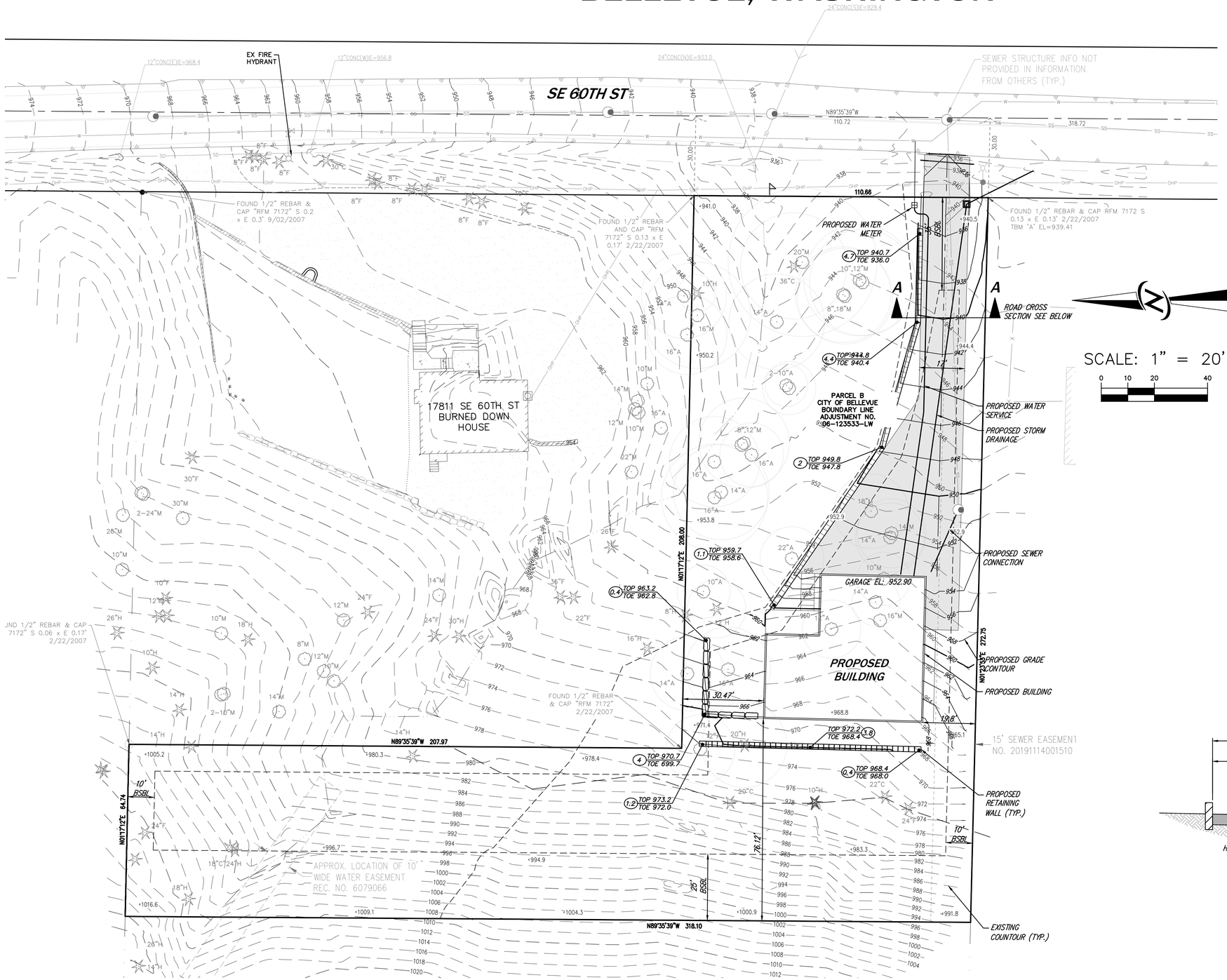
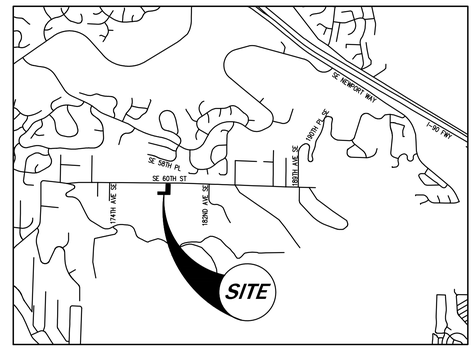
SE 1/4 OF SE 1/4 OF SEC. 24, TWP.24 N., RGE. 5 E., W.M.

BROWN - DIVINE PROPERTY

STEVE BROWN & JULIE DIVINE

BELLEVUE, WASHINGTON





N

VICINTY MAP

1" = 2,000'

SCALE: 1" = 20'

0 10 20 40

OWNER/APPLICANT

STEVE BROWN & JULIE DIVNE
P.O. BOX 357
SNOHOMISH, WA 98291
(360) 568-5985
CONTACT: STEVE BROWN

ENGINEER

CORE DESIGN INC.
12100 N.E. 195TH ST, SUITE 300
BOTHELL, WASHINGTON 98011
(425) 885-7877
CONTACT: MICHAEL A. MOODY, P.E.

DATUM

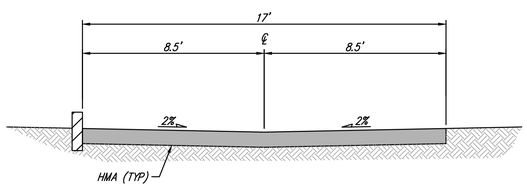
NAVD 88

IMPERVIOUS AREA

TOTAL IMPERVIOUS AREA = 7,455 SF

LEGAL DESCRIPTION

PARCEL B, CITY OF BELLEVUE BOUNDARY LINE ADJUSTMENT NO. 06-123533-LW, RECORDED UNDER RECORDING NUMBER 20061127900002, IN KING COUNTY, WASHINGTON;. SITUATE IN THE COUNTY OF KING, STATE OF WASHINGTON.



(ROAD A)

SECTION A-A

NOT TO SCALE

PERMIT NO. xx-xxxxxx xx
C.O.B GRID #xx & #xx

REVISIONS

NO.	DATE

10-22-20

CIVIL ENGINEERING
LANDSCAPE ARCHITECTURE
PLANNING
SURVEYING

CORE DESIGN

12100 NE 195th St, Suite 300 Bothell, Washington 98011 425.885.7877

SITE PLAN B
BROWN-DIVINE PROPERTY

STEVE BROWN/JULIE DIVINE
PO BOX 357
SNOHOMISH, WA 98291

DATE	OCTOBER 2020
DESIGNED	FLAVIO BAINOTTI
DRAWN	CHUCK FEMLING
APPROVED	MICHAEL A. MOODY, P.E.

MICHAEL A. MOODY, P.E.
PROJECT MANAGER

SHEET	OF
1	1

PROJECT NUMBER
20155

10/26/2020 3:54 PM J:\2020\20155\ENGINEERING\FINAL\SHEETS\20155 C3.01.DWG

Altmann Oliver Associates, LLC

PO Box 578 Carnation, WA 98014 Office (425) 333-4535 Fax (425) 333-4509

AOA
Environmental
Planning &
Landscape
Architecture

October 26, 2020

AOA-4548B

Craig J. Krueger
CJK@coredesigninc.com

SUBJECT: **Critical Areas Review for Brown/Divide Residence**
Parcel 242405-9036, Bellevue, WA
Habitat Assessment and Vegetation Management Plan

Dear Craig:

On December 12, 2019 I conducted a wetland and stream reconnaissance on the subject property utilizing the methodology outlined in the May 2010 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0).* A habitat assessment was also conducted. The property is undeveloped and consists primarily of a mixed upland forest that slopes down from south to north. Much of the eastern portion of the site has been disturbed through the installation of a sewer line.

The proposed project consists of the development of a single-family residence in the southeastern portion of the site. The purpose of this report is to: 1) describe the critical areas identified on the site, 2) identify proposed modifications to the critical areas, and 3) describe the measures that will be implemented to mitigate and support these modifications.

1.0 EXISTING CRITICAL AREAS

One stream (Stream 1) was identified within a well-defined channel that drains north through the northwest portion of the site. The top of bank of this channel was previously delineated and surveyed by others and the surveyed stream location does not appear to have changed. No hydrophytic plant communities or wetlands were identified on the site.

Borings taken throughout the site revealed high chroma non-hydric soils and there was no evidence of ponding or prolonged soil saturation anywhere outside of the stream channel.

Stream 1 meets the criteria for a Type N stream and requires a standard 50-foot buffer plus 15-foot structure setback per BMC 20.25H.035.A.

In addition, a steep slope has been identified within the southern portion of the site. Steep slopes require a standard 75-foot buffer from the toe of the slope.

2.0 WILDLIFE HABITAT ASSESSMENT

A habitat assessment was conducted on the property during the reconnaissance on December 12, 2019. Prior to conducting the field investigations, the Washington State Department of Fish and Wildlife's Priority Habitats and Species (PHS) database was reviewed. No priority habitats or species were identified on or immediately adjacent to the site as part of this mapping.

2.1 Description of Vegetation on and Adjacent to the Site

Vegetation on the site consisted primarily of an unevenly aged mix ed upland forest that included Douglas fir (*Pseudotsuga menziesii*), western hemlock (*Tsuga heterophylla*), western red cedar (*Thuja plicata*), big-leaf maple (*Acer macrophyllum*), red alder (*Alnus rubra*), salmonberry (*Rubus spectabilis*), red elderberry (*Sambucus racemosa*), and sword fern (*Polystichum munitum*).

Much of the stream buffer and eastern portion of the site was degraded at the time of the site review. Habitat features within the forest on the property consisted primarily of widely scattered small to moderately sized down logs and snags. Vegetation within the adjacent undeveloped off-site areas appeared similar to the on-site plant community.

2.2 Wildlife Species of Local Importance

Twenty-three (23) species have been designated by the City of Bellevue as species of local importance (**LUC 20.25H.150**). The potential of site utilization by each species is briefly described below:

- Bald eagle (*Haliaeetus leucocephalus*): site not located within Bald Eagle Buffer Management Zone per PHS data. Some potential occasional perching opportunity within larger on-site trees possible but does not have a primary association with habitat on or immediately adjacent site. Primary Association: no.

- Peregrine falcon (*Falco peregrinus*): generally associated with coastal cliffs and shorelines, but also use large buildings in city center. Use of project site unlikely. Primary Association: no.

- Common Loon (*Gavia immer*): no presence - highly aquatic species associated with large water bodies. Primary Association: no.

- Pileated woodpecker (*Dryocopus pileatus*): Pileated woodpeckers generally inhabit mature and old-growth forests, and second-growth forests with large snags and fallen trees. The range of the species encompasses all the forested areas of the state. Although typically found in larger forested tracts, they are known to occur in suburban habitats as well. Their key breeding habitat need is the presence of large snags or decaying live trees for nesting,

as this species generally excavates a new nest cavity each year. The breeding and nesting periods of the pileated woodpecker extends from late March to early July. Although foraging potential is present, no pileated woodpecker nests were observed on the site during the field investigation and the lack of large snags limits the nesting potential of this species. Primary Association: no.

- Vaux's swift (*Chaetura vauxi*): Vaux's swifts are strongly associated with old growth and mature forests throughout the state and are highly dependent on large hollow trees and snags for breeding and roosting. Although some potential for foraging, unlikely nesting or primary association on the site due to lack of large snags. Primary Association: no.

- Merlin (*Falco columbarius*): unlikely presence – generally require coastal or high elevation forests. Primary Association: no.

- Purple martin (*Progne subis*): unlikely presence – generally require cavities near or over water for nesting. Primary Association: no.

- Western grebe (*Aechmophorus occidentalis*): no presence – highly aquatic species associated with large water bodies. Primary Association: no.

- Great blue heron (*Ardea herodias*): unlikely presence – typically forage in larger wetlands or pasture which do not occur on-site. No roosts observed on or adjacent site. Primary Association: no.

- Osprey (*Pandion haliaetus*): unlikely presence - perch availability not near large water body. Primary Association: no.

- Green heron (*Butorides striatus*): unlikely presence – not near large wetland or waterbody. Primary Association: no.

- Red-tailed hawk (*Buteo jamaicensis*): potential utilization of site for occasional perching, although no nests observed and not near significant open expanse. Primary Association: no.

- Western big-eared bat (*Plecotus townsendii*): potential presence, but no known nearby hibernacula or caves so not considered a habitat of primary association. Primary Association: no.

- Keen's myotis (*Myotis keenii*): potential presence, but generally associated with larger coniferous forests so not considered a habitat of primary association. Primary Association: no.

- Long-legged myotis (*Myotis volans*): potential presence, but generally associated with larger coniferous forests so not considered a habitat of primary association. Primary Association: no.

- Long-eared myotis (*Myotis evotis*): potential presence, but generally associated with larger coniferous forests so not considered a habitat of primary association. Primary Association: no.

- Oregon spotted frog (*Rana pretiosa*): no presence - believed to be extirpated from nearly all of western Washington and no ponding on the site. Primary Association: no.

- Western toad (*Bufo boreas*): presence possible but no breeding potential and not considered habitat of primary association. Primary Association: no.

- Western pond turtle (*Clemmys marmorata*): no presence - no ponding on site and no known nearby populations. Primary Association: no.

- Chinook (*Oncorhynchus tshawytscha*): no presence – no fish streams on the site. Primary Association: no.

- Bull trout (*Salvelinus confluentus*): no presence – no fish streams on the site. Primary Association: no.

- Coho salmon (*Oncorhynchus kisutch*): no presence – no fish streams on the site. Primary Association: no.

- River lamprey (*Lampetra ayresi*): no presence – no fish streams on the site. Primary Association: no.

None of the 23 species of local importance appear to have a primary association with habitat on or immediately adjacent the project site.

2.3 Impacts to Wildlife Species of Local Importance from Proposed Project

The proposed project includes the construction of a single-family residence and access drive in the eastern portion of the site. The project requires the removal of significant trees for the construction of this residence. In addition, understory and groundcover vegetation would also be removed in areas that are not currently disturbed.

Since none of the species of local importance appear to have a primary association with the project site, there are no anticipated significant impacts to these species from the proposed development. However, since the forested portions of the site do provide potential habitat for several species of local importance, it is our understanding that these forested areas may be considered a critical area and subject to the habitat performance standard outlined in LUC 20.25H.160.

Per previous discussions with City of Bellevue staff, the Habitat Management Plan required under LUC 20.25H.160 should focus on the pileated woodpecker since it would be considered a keystone species.

2.4 Habitat Management Plan for Pileated Woodpecker

Pileated woodpeckers generally inhabit mature and old-growth forests, and second-growth forests with large snags and fallen trees. The range of the species encompasses all the forested areas of the state. Although typically found in larger forested tracts, they are known to occur in suburban habitats as well. Their key breeding habitat need is the presence of large snags or decaying live trees for nesting, as this species generally excavates a new nest cavity each year. The breeding and nesting periods of the pileated woodpecker extends from late March to early July.

No pileated woodpecker nests were observed on the site during the field investigations and the lack of large snags currently limits the nesting potential of this species on the property. However, this species may potentially utilize the larger trees on the site for foraging.

Management Recommendations

The Washington Department of Fish and Wildlife's *Management Recommendations for Washington's Priority Species Volume IV: Birds (2004)* provides management recommendations for pileated woodpeckers in suburban areas. These recommendations include:

- Conserving larger forest patches with large trees and snags
- Retaining forest in the largest patches available (>74 acres would be considered large). Where large patches are unavailable, smaller patches should be retained; where the average size of smaller patches should be no less than approximately 7 acres.
- Retaining or creating snags as well as retaining live trees in the largest size classes available in the stand.

Since preserving the recommended forest patch size is not feasible on this site, to continue to allow for the potential use of the forested portions of the site by pileated woodpeckers, it is my recommendation that:

- All existing significant trees and habitat features located outside of the currently proposed clearing limits be retained to the extent feasible. Special care should be taken to avoid the largest trees on the property.
- Although I do not believe it necessary to create snags from any of the existing live healthy trees on the property, if any trees on the site are deemed hazardous and must be removed for safety concerns, then it is my recommendation that a snag be created from that tree at the tallest appropriate point. Furthermore, any trees within the forested portions of the site that naturally become snags should remain in place and not be removed unless they become a safety concern.
- Implement the habitat enhancement mitigation plan (**Figures 1 through 6**). This plan provides for the planting of a variety of native tree and shrub species as mitigation for impacts to the steep slope buffer.

3.0 PROPOSED PROJECT

The proposed project consists of the development of a single-family residence in the southeastern portion of the site. As part of the project a split-rail fence and critical area signage will be installed along the 50-foot stream buffer and the area preserved in perpetuity.

The proposed project does, however, require the encroachment into 5,972 s.f. of the 75-foot standard toe of slope buffer. Per the geotechnical engineer, the standard 75-foot steep slope setback from the toe of the slope can be reduced to 10 feet. It is my understanding that the proposed project has been designed to avoid all work within these recommended geotechnical setbacks and no work is proposed on the steep slope.

Due to the stream buffer and topographic site constraints the available space for a single-family residence is limited to the southeastern portion of the property. Since nearly the entire property is encumbered by the stream and steep slope buffers, it is not possible to entirely avoid these impacts.

3.1 Steep Slope Buffer Reduction

Any proposals to reduce a standard steep slope buffer must meet the decision criteria of **LUC 20.25H.255.B**

B. Decision Criteria – Proposals to Reduce Regulated Critical Area Buffer.

The Director may approve, or approve with modifications, a proposal to reduce the regulated critical area buffer on a site where the applicant demonstrates:

1. *The proposal includes plans for restoration of degraded critical area or critical area buffer functions which demonstrate a net gain in overall critical area or critical area buffer functions;*

   A habitat enhancement plan for the degraded habitats on the site has been prepared. Enhancement will occur through the removal of invasive plant species and re-planting degraded or sparsely vegetated areas with a variety of native plant species to the extent feasible on the site.

2. *The proposal includes plans for restoration of degraded critical area or critical area buffer functions which demonstrate a net gain in the most important critical area or critical area buffer functions to the ecosystem in which they exist;*

   Since the primary function of the steep slope buffers on the site is as a component of the overall habitat on the property, an enhancement plan has been prepared to increase the plant species and structural diversity of the degraded habitats on the site to the extent feasible.

3. *The proposal includes a net gain in stormwater quality function by the critical area buffer or by elements of the development proposal outside of the reduced regulated critical area buffer;*

   The proposed project will be constructed outside of the geotechnical consultant recommended steep slope buffers and it is my understanding that the project will be designed to incorporate all required City of Bellevue stormwater management measures.

4. *Adequate resources to ensure completion of any required restoration, mitigation, and monitoring efforts;*

   To ensure success of the enhancement, a performance bond for the enhancement area will be posted for the 5-year monitoring period. This bond will not be released until all the performance standards have been met.

5. *The modifications and performance standards included in the proposal are not detrimental to the functions and values of critical area and critical area buffers off-site; and*

   The performance standards for the project have been developed to increase the structural and plant species diversity of the enhancement areas and per the Geotechnical consultant will not be detrimental to the steep slope functions.

6. *The resulting development is compatible with other uses and development in the same land use district. (Ord. 5680, 6-26-06)*

   The residential project is compatible with adjacent land uses and meets the zoning requirements for the land use district.

3.2 Decision Criteria per LUC 20.30P.140

The Director may approve or approve with modifications an application for a Critical Areas Land Use Permit if:

A. *The proposal obtains all other permits required by the Land Use Code; and*

It is our understanding that all other permits required by the Land Use Code will be obtained.

B. *The proposal utilizes to the maximum extent possible the best available construction, design and development techniques which result in the least impact on the critical area and critical area buffer; and*

The project will need to utilize all the best available construction, design, and development techniques to ensure the least possible impact on the critical area and its buffer. A final erosion control plan should be prepared, and silt-fencing and tree protection fencing will also be required.

To minimize light impacts on wildlife habitat, all outdoor lights from the residence should contain low-wattage bulbs with narrow angles of illumination.

All plantings within the buffer will consist of native species and will be installed and maintained only by a qualified landscape contractor familiar with work in sensitive environments.

C. The proposal incorporates the performance standards of Part 20.25H LUC to the maximum extent applicable; and

All the applicable performance standards in LUC 20.25H would be implemented to the maximum extent possible.

D. The proposal will be served by adequate public facilities including streets, fire protection, and utilities; and

It is our understanding that the proposal will be served by adequate public facilities including streets, fire protection, and utilities.

E. The proposal includes a mitigation or restoration plan consistent with the requirements of LUC 20.25H.210; except that a proposal to modify or remove vegetation pursuant to an approved Vegetation Management Plan under LUC 20.25H.055.C.3.i shall not require a mitigation or restoration plan; and

A critical area restoration and enhancement plan has been prepared that is consistent with the requirements of LUC 20.25H.

F. The proposal complies with other applicable requirements of this code.

It is our understanding that all other applicable requirements of the Land Use Code will be met.

4.0 FUNCTIONAL ASSESSMENT

Per LUC 20.25H.250.B.5, the City of Bellevue requires an *analysis of the level of protection of critical area functions and values provided by the regulations or standards of this code, compared with the level of protection provided by the proposal. The analysis shall include:*

a. *A discussion of the functions and values currently provided by the critical area and critical area buffer on the site and their relative importance to the ecosystem in which they exist*;

Critical areas on the site include both a Type N stream and a steep slope with associated buffer areas. Stream buffers, in general, provide many valuable ecological and social functions, including water quality protection and wildlife habitat. These buffer areas also often provide stormwater

storage that may reduce downstream flooding while trapping sediments. The trapping of sediments and other pollutants within a stream buffer maintains water quality in downstream areas and aids in the prevention of fish habitat degradation by limiting silt accumulation within spawning areas.

As part of the project, the stream buffer on the site will be enhanced with native plantings and protected in perpetuity.

The primary function of the steep slope and the steep slope buffers on this site are as a component of the overall habitat on the property and the adjacent undeveloped areas, and not as specific habitat for an individual species of local importance. The slope stability functions of the slope buffer have been assessed by the geotechnical engineer and it is my understanding the standard 75-foot steep slope setback from the toe of the slope can be reduced to 10 feet.

b. *A discussion of the functions and values likely to be provided by the critical area and critical area buffer on the site through application of the regulations and standards of this Code over the anticipated life of the proposed development; and*

The steep slopes on the site will be provided the toe of slope recommended buffers per the geotechnical engineer and no direct steep slope impacts are proposed. The stream will be provided the required buffer and a rail fence will be installed along the buffer boundary. All critical areas and the proposed buffers will be protected in perpetuity.

c. *A discussion of the functions and values likely to be provided by the critical area and critical area buffer on the site through the modifications and performance standards included in the proposal over the anticipated life of the proposed development;*

Enhancement of the degraded areas on the site will increase the habitat value of the property by increasing the plant species and structural diversity within the preserved habitat. The proposed plantings will increase the quality of the preserved habitat on the site and provide a denser protected connection to off-site habitat areas, while also providing increased physical and visual screening to the protected habitat areas from the proposed residence.

Without implementation of the proposed planting plan, the slope and stream buffer areas will likely become established with invasive species such as Himalayan blackberry that limit the diversity within the understory and groundcover on the site. Implementation of the maintenance and monitoring plan will reduce the extent of invasive species on the site and allow for the establishment of an increasingly diverse plant community.

5.0 SLOPE BUFFER MITIGATION

A habitat enhancement plan has been prepared by AOA. As part of the enhancement plan, invasive species would be removed, and the area planted with a variety of native species to the extent feasible. The native plantings would increase the plant species and structural diversity of the site while providing increased visual and physical screening to the preserved habitat from the proposed residence.

5.1 Goal, Objectives, and Performance Standards for Enhancement Areas

The primary goal of the mitigation plan is to increase the habitat functions of the enhanced portions of the site over current conditions. To meet this goal, the following objectives and performance standards have been incorporated into the design of the plan:

Objective A: Increase the structural and plant species diversity within the enhancement areas.
Performance Standard: There will be 100% survival of all woody planted species throughout the enhancement areas at the end of the first year of planting. Following Year 1, success will be based on an 85% survival rate. Areal coverage of plantings or native re-colonized species will be at least 10% at Year 1, 15% at Year 2, 25% at Year 3, 50% at Year 4, and 60% at Year 5.

Objective B: Limit the amount of invasive and exotic species within the enhancement areas.
Performance Standard: After construction and following every monitoring event for a period of at least five years, exotic and invasive plant species will be maintained at levels below 10% total cover in all planted areas.

5.2 Construction Management

Prior to commencement of any work in the enhancement areas, the clearing limits will be staked and all existing vegetation to be saved will be clearly marked. A pre-construction meeting will be held at the site to review and discuss all aspects of the project with the landscape contractor and the owner.

A consultant will supervise plan implementation during construction to ensure that objectives and specifications of the enhancement plan are met. Any necessary significant modifications to the design that occur because of unforeseen site conditions will be jointly approved by the City of Bellevue and the consultant prior to their implementation.

5.3 Monitoring Methodology

The monitoring program will be conducted for a period of five years, with annual reports submitted to the City of Bellevue. Permanent vegetation sampling plots will be established to monitor the general appearance, health, mortality, colonization rates, percent cover, percent survival, volunteer plant species, and invasive weeds.

Photo-points will be established from which photographs will be taken throughout the monitoring period. These photographs will document general appearance and progress

in plant community establishment in the enhancement areas. Review of the photos over time will provide a visual representation of success of the plan.

5.4 Maintenance Plan
Maintenance will be conducted on a routine, year-round basis. Additional maintenance needs will be identified and addressed following a twice-yearly maintenance review. Contingency measures and remedial action on the site shall be implemented on an as-needed basis at the direction of the consultant or the owner.

Routine removal and control of non-native and other invasive plants (e.g., Himalayan and evergreen blackberry, Japanese knotweed, English ivy, thistle, and creeping nightshade) should be performed by manual means whenever possible. Undesirable and weedy exotic plant species shall be maintained at levels below 10% total cover within any given stratum at any time during the five-year monitoring period.

5.5 Contingency Plan
All dead plants will be replaced with the same species or an approved substitute species that meets the goal of the enhancement plan. Plant material shall meet the same specifications as originally installed material. Replanting will not occur until after reason for failure has been identified (e.g., moisture regime, poor plant stock, disease, shade/sun conditions, wildlife damage, etc.). Replanting shall be completed under the direction of the consultant, City of Bellevue, or the owner.

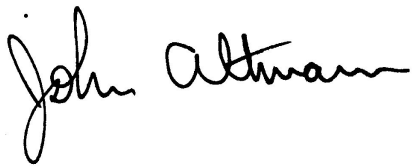
5.6 As-Built Plan
Following completion of construction activities, an as-built plan for the enhancement area will be provided to the City of Bellevue. The plan will identify and describe any changes in relation to the original approved plan.

5.7 Financial Guarantee
A financial guarantee will be posted to ensure that the mitigation and monitoring program is fully implemented.

If you have any questions, please give me a call.

Sincerely,

ALTMANN OLIVER ASSOCIATES, LLC



John Altmann
Ecologist

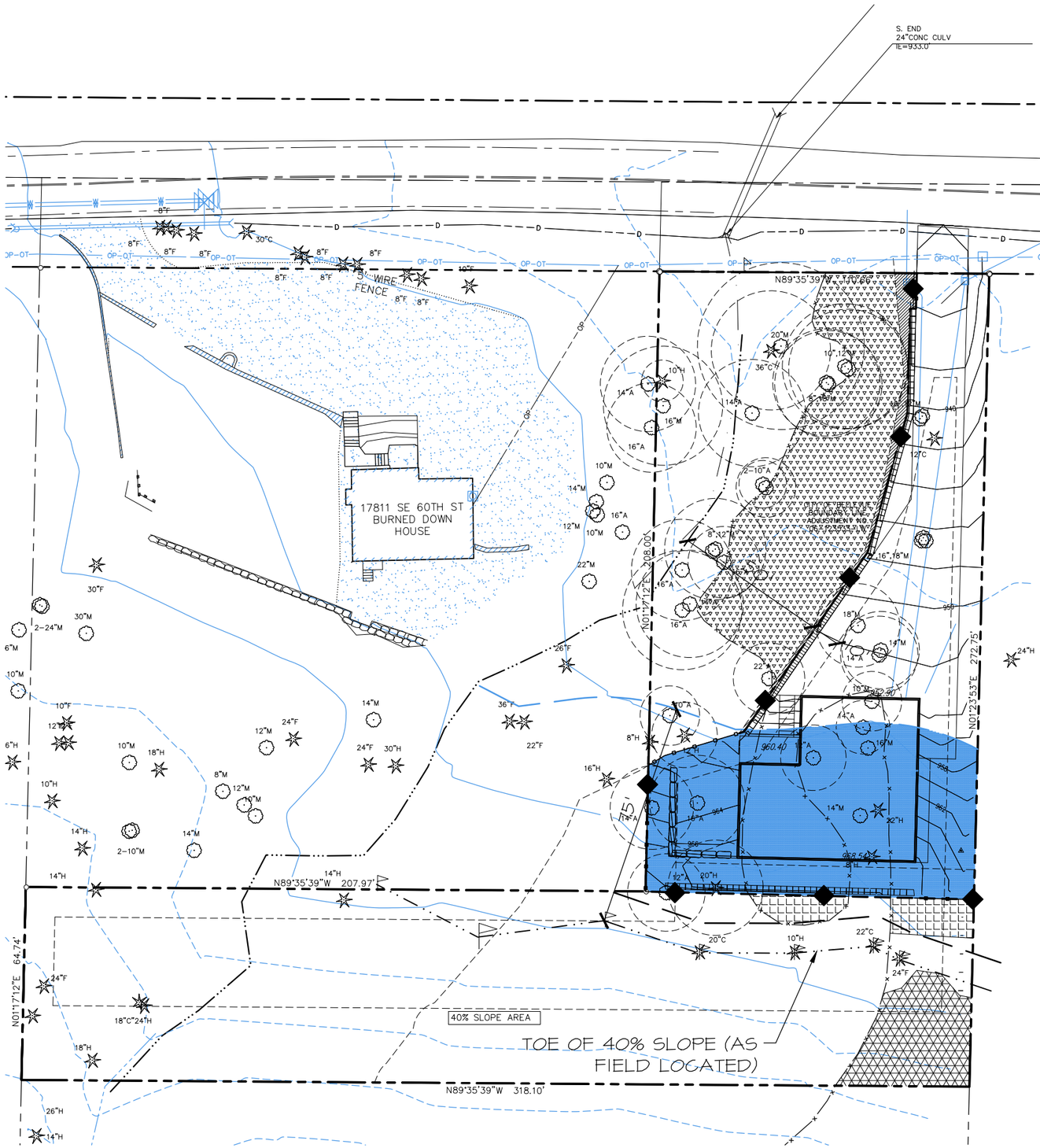
Attachments

Parcel 2424059036

Date: 10/26/2020 Notes:

N

King County



PLAN LEGEND

- PROPERTY LINE
- ORDINARY HIGH WATER
- TOE OF 40% SLOPE
- 50' STREAM BUFFER
- 75' TOE OF SLOPE BUFFER
- 10' REDUCED STEEP SLOPE BUFFER
- PROPOSED STREAM BUFFER
- PROPOSED STEEP SLOPE BUFFER
- 10' BSBL
- RESTORATION LIMITS / EDGE OF NATIVE FOREST
- EXISTING TREES
- SPLIT-RAIL FENCE
- CRITICAL AREA SIGN - 50' SPACING ALONG PROPOSED BUFFERS

IMPACT LEGEND

- STEEP SLOPE BUFFER REDUCTION - 5,972 SF

MITIGATION LEGEND

- STEEP SLOPE RESTORATION - 1,223 SF
- STEEP SLOPE BUFFER RESTORATION - 601 SF
- STREAM BUFFER RESTORATION - 4,326 SF
- ADDITIONAL STREAM BUFFER RESTORATION / REPLACED STREAM BUFFER - 333 SF

TOTAL MITIGATION - 6,483 SF

GRAPHIC SCALE
(IN FEET)

0 20 40 60 80 120

SCALE: 1:40

N

NOTES

1. BASE INFORMATION PROVIDED BY CORE DESIGN, INC., 12100 NE 195TH ST., SUITE 300, BOTHELL, WA 98011, (425) 885-7877.

PROJECT 4548B
DRAWN SO
SCALE AS NOTED
DATE 10-27-20
REVISED
1/6

FIGURE 1: BUFFER MITIGATION PLAN
STEEP SLOPE AND STREAM BUFFER MITIGATION PLAN
BROWN DIVINE
PARCEL 242405-9036
BELLEVUE, WASHINGTON

Altmann Oliver Associates, LLC
AOA
Environmental Planning & Landscape Architecture
PO Box 578 Carnation, WA 98014 Office (425) 333-4535 Fax (425) 333-4569

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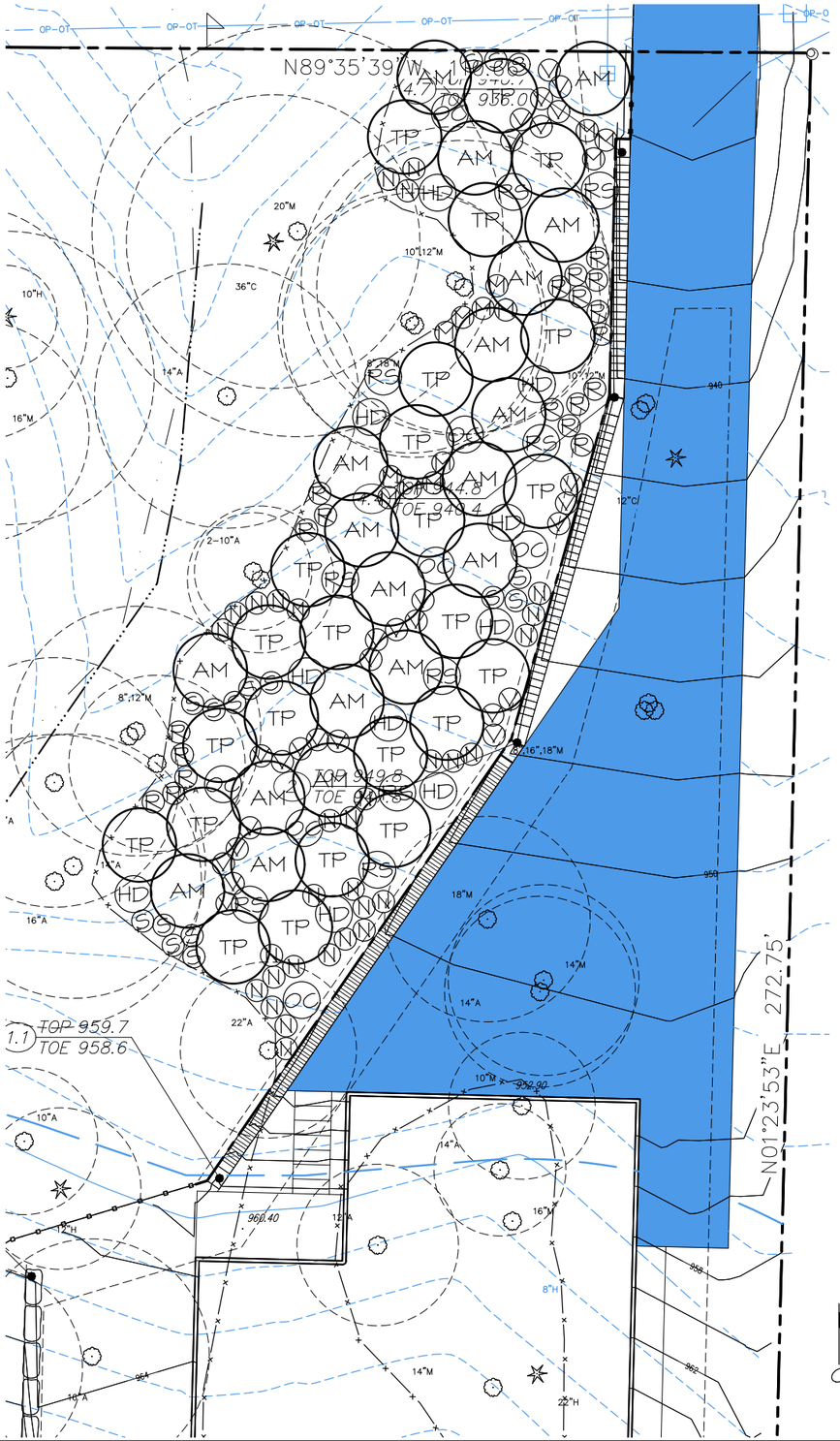

PLANT SCHEDULE

TREES

KEY	SCIENTIFIC NAME	COMMON NAME	DENSITY	QTY.	SIZE (MIN.)	NOTES
AM	ACER MACROPHYLLUM	BIGLEAF MAPLE	9' O.C.	24	2 GAL.	SINGLE TRUNK
TP	THUJA PLICATA	WESTERN RED CEDAR	9' O.C.	30	2 GAL.	FULL & BUSHY

SHRUBS

KEY	SCIENTIFIC NAME	COMMON NAME	DENSITY	QTY.	SIZE (MIN.)	NOTES
HD	HOLODISCUS DISCOLOR	OCEAN SPRAY	6' O.C.	12	1 GAL.	MULTI-STEM (3 MIN.)
M	MAHONIA AQUIFOLIUM	TALL OREGON GRAPE	6' O.C.	13	1 GAL.	FULL & BUSHY
OC	OEMLERIA CERASIFORMIS	INDIAN PLUM	6' O.C.	12	1 GAL.	MULTI-STEM (3 MIN.)
RS	RIBES SANGUINEUM	RED CURRANT	6' O.C.	15	1 GAL.	MULTI-STEM (3 MIN.)
N	ROSA NUTKANA	NOOTKA ROSE	6' O.C.	37	1 GAL.	MULTI-STEM (3 MIN.)
R	RUBUS SPECTABILIS	SALMON BERRY	6' O.C.	27	1 GAL.	MULTI-STEM (3 MIN.)
S	SYMPHORICARPOS ALBUS	SNOWBERRY	6' O.C.	34	1 GAL.	MULTI-STEM (3 MIN.)
V	VACCINIUM OVATUM	EVERGREEN HUCKLEBERRY	6' O.C.	37	1 GAL.	FULL & BUSHY

NOTES

1. BASE INFORMATION PROVIDED BY CORE DESIGN, INC., 12100 NE 195TH ST., SUITE 300, BOTHELL, WA 98011, (425) 885-7877.

PROJECT 4548B
DRAWN SO
SCALE AS NOTED
DATE 10-27-20
REVISED
2/6

FIGURE 2: PLANTING PLAN
STEEP SLOPE AND STREAM BUFFER MITIGATION PLAN
BROWN DIVINE
PARCEL 242405-9036
BELLEVUE, WASHINGTON

Altmann Oliver Associates, LLC
AOA
Environmental Planning & Landscape Architecture
PO Box 578 Carnation, WA 98014 Office (425) 333-4535 Fax (425) 333-4569

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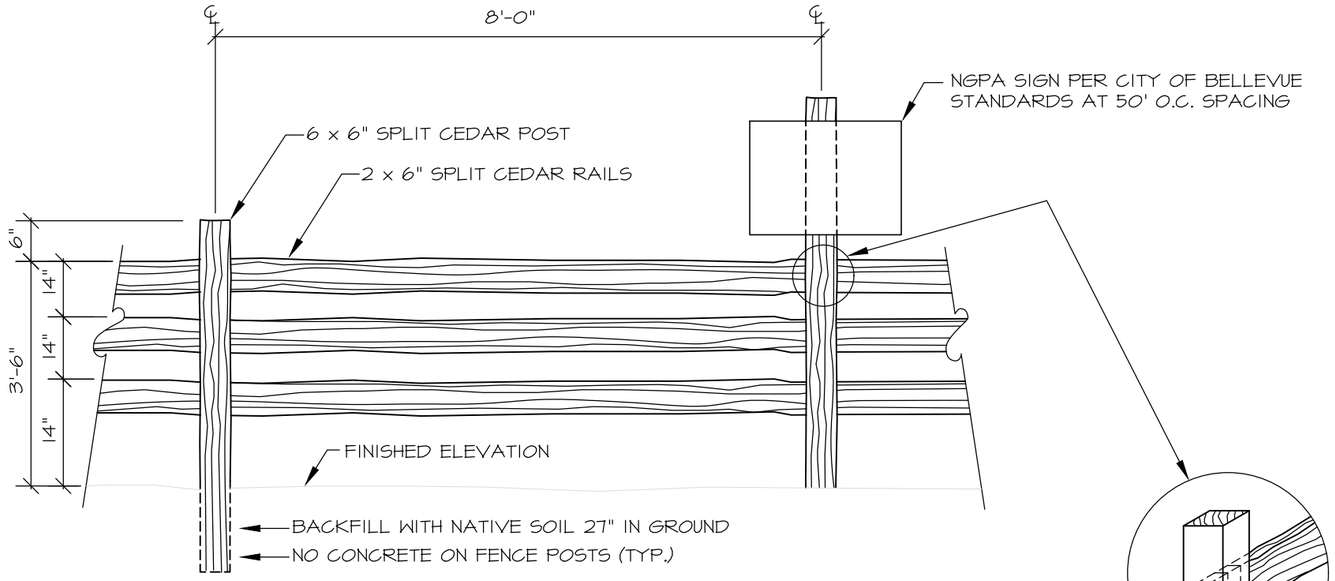
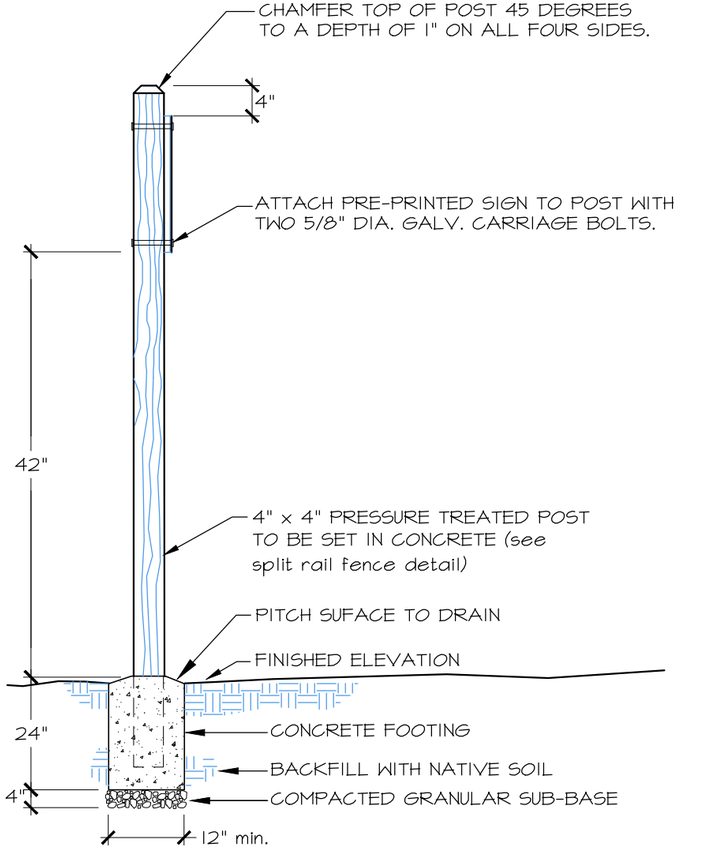


POST CONNECTION

1 SPLIT-RAIL FENCE WITH NGPA SIGNS

SCALE: NTS



2 NGPA SIGN (TYP.)

SCALE: NTS

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FIGURE 3: CONSTRUCTION DETAILS
STEEP SLOPE AND STREAM BUFFER MITIGATION PLAN
BROWN DIVINE
PARCEL 242405-9036
BELLEVUE, WASHINGTON

Altmann Oliver Associates, LLC
AOA Environmental Planning & Landscape Architecture
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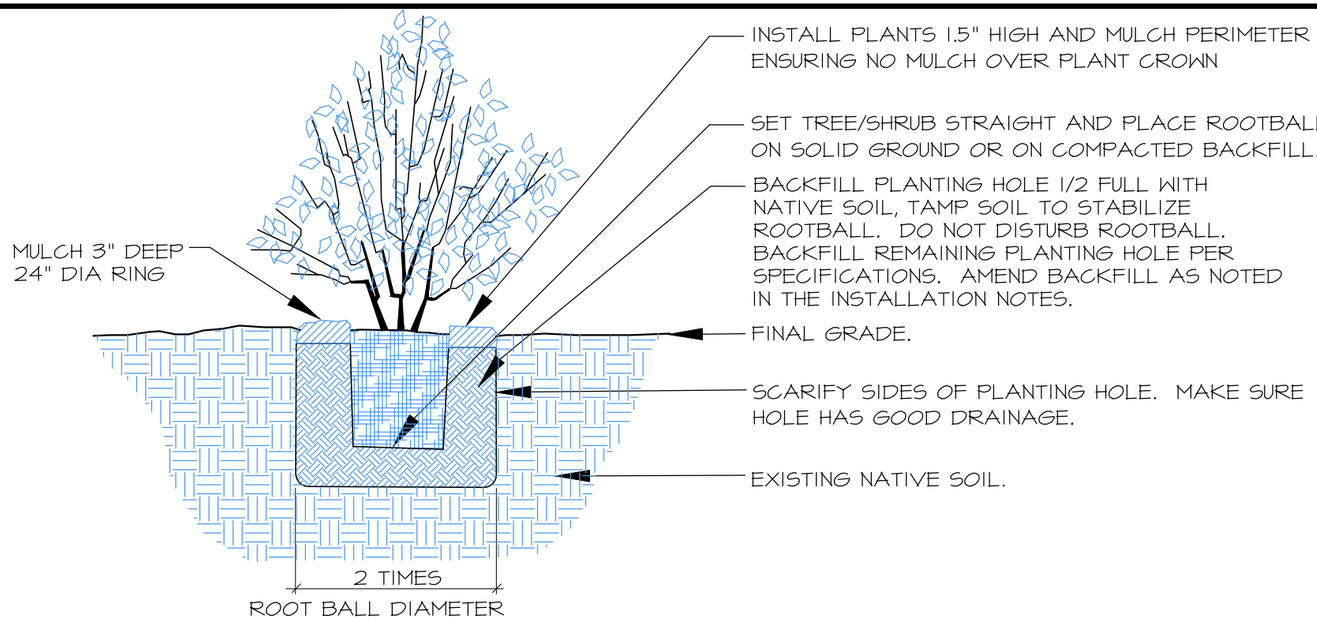
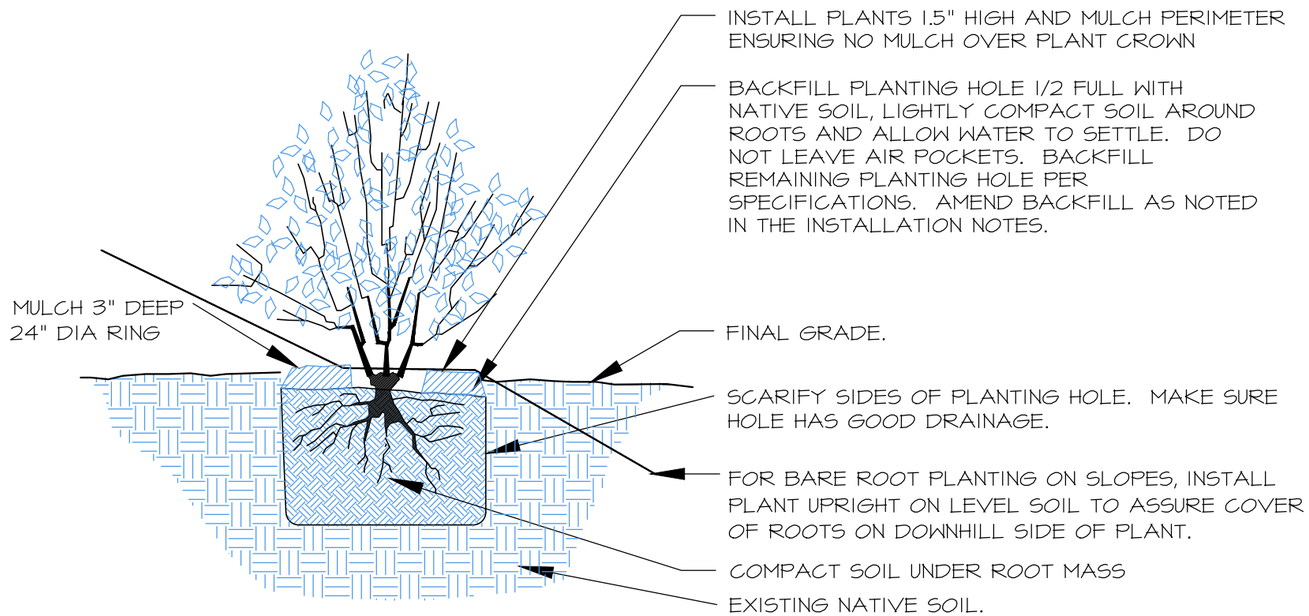


1 CONTAINER TREE/SHRUB PLANTING (TYP.)

SCALE: NTS



2 BARE-ROOT SHRUB PLANTING (TYP.)

SCALE: NTS

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FIGURE 4: PLANTING DETAILS
STEEP SLOPE AND STREAM BUFFER MITIGATION PLAN
BROWN DIVINE
PARCEL 242405-9036
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SPECIFICATIONS

1. CONTRACTOR INFORMATION. WHEN IT IS AVAILABLE, CONTACT INFORMATION SHALL BE PROVIDED TO THE CITY OF BELLEVUE THAT INCLUDES NAMES, ADDRESSES AND PHONE NUMBERS OF PERSONS/FIRMS THAT WILL BE RESPONSIBLE FOR INSTALLING REQUIRED PLANTS AND PERFORMING REQUIRED MAINTENANCE.
2. CONTRACTOR'S QUALIFICATIONS. ALL WORK SHALL BE PERFORMED BY A LICENSED LANDSCAPE CONTRACTOR REGISTERED IN THE STATE OF WASHINGTON. CONTRACTOR MUST BE EXPERIENCED IN MITIGATION AND RESTORATION WORK. THE CONTRACTOR SHALL PROVIDE THAT THERE IS ONE PERSON ON THE SITE AT ALL TIMES DURING WORK AND INSTALLATION WHO IS THOROUGHLY FAMILIAR WITH THE TYPE OF MATERIALS BEING INSTALLED AND THE BEST METHODS FOR THEIR INSTALLATION, AND WHO SHALL DIRECT ALL WORK BEING PERFORMED UNDER THESE SPECIFICATIONS. THIS PERSON SHALL HAVE A MINIMUM OF FIVE (5) YEARS EXPERIENCE INSTALLING NATIVE PLANT MATERIALS FOR WETLAND MITIGATION OR RESTORATION PROJECTS, UNLESS OTHERWISE ALLOWED BY THE LANDSCAPE DESIGNER, WETLAND BIOLOGIST AND/OR THE CITY OF BELLEVUE.
3. IN ALL MITIGATION AREAS, WA STATE CLASS A, B AND C NOXIOUS WEEDS SHALL BE GRUBBED AND MAINTAINED OUT OF THE MITIGATION AREAS FOR THE DURATION OF 5-YEAR MONITORING PERIOD. GRUBBED PLANTS TO BE REMOVED FROM SITE PRIOR TO PLANTING.
4. ALL PLANTS SHOULD BE INSTALLED BETWEEN DECEMBER 1ST AND MARCH 15TH UNLESS IRRIGATION IS PROVIDED AT TIME OF PLANTING.
5. INTERMEDIATE INSPECTIONS. ALL PLANTS SHALL BE INSPECTED AND APPROVED BY THE LANDSCAPE DESIGNER AND/OR WETLAND BIOLOGIST PRIOR TO INSTALLATION. CONDITION OF ROOTS OF A RANDOM SAMPLE OF PLANTS WILL BE INSPECTED, AS WELL AS ALL ABOVEGROUND GROWTH ON ALL PLANTS. ROOTS OF ANY BARE ROOT PLANTS, IF PERMITTED FOR USE, WILL BE INSPECTED. PLANT MATERIAL MAY BE APPROVED AT THE SOURCE, AT THE DISCRETION OF THE LANDSCAPE DESIGNER AND THE WETLAND BIOLOGIST, BUT ALL MATERIAL MUST BE RE-INSPECTED AND APPROVED ON THE SITE PRIOR TO INSTALLATION. PLANT LOCATIONS SHALL ALSO BE INSPECTED AND APPROVED PRIOR TO PLANTING.
6. PRIOR TO INSTALLATION OF PLANT MATERIAL, THE PLANTING AREAS WILL BE LAID OUT BASED ON THE PLANTING PLAN.
7. PRIOR TO ANY WORK WITHIN THE RESTORATION AREAS, THE SCOPE OF THE RESTORATION WORK WILL BE REVIEWED BY AOA, THE LANDSCAPE CONTRACTOR AND THE GENERAL CONTRACTOR TO ENSURE THAT ALL PARTIES UNDERSTAND PLAN SPECIFICS.
8. UPON REMOVAL OF INVASIVES, AOA SHALL REVIEW THE SITE WITH THE LANDSCAPE CONTRACTOR TO DETERMINE LOCATIONS OF TOPSOIL PLACEMENT. TOPSOIL SHALL BE PLACED AND LIGHTLY TILLED INTO THE TOP 6" OF NATIVE SOILS PRIOR TO PLANTING.
9. ALL PLANTS SHALL BE PIT-PLANTED IN PLANTING PITS EXCAVATED 2X THE DIAMETER OF THE PLANT. PITS SHALL BE BACKFILLED WITH A 30/70 MIX OF STEERCO TO NATIVE TOPSOIL. PLANTS SHALL BE INSTALLED 3" HIGH AND SURFACED MULCHED TO A DEPTH OF 3" WITH HOG-FUEL, WOOD CHIPS OR BARK MULCH PLACED CONTINUOUSLY THROUGHOUT THE PLANTING BED.
10. NGPA BOUNDARY FENCE AND SIGNAGE - THE APPLICANT SHALL PERFORM A FIELD SURVEY OF PROPOSED BUFFER BOUNDARIES COMPLETED BY A WASHINGTON STATE LICENSED SURVEYOR. THE BOUNDARY OF THE NGPA SHALL BE IDENTIFIED, FENCED OR DEMARCATED BY WALLS, AND MARKED WITH NGPA BOUNDARY SIGNAGE PER FIGURE 1.
11. ALL PLANTS SHALL BE NURSERY GROWN (IN WESTERN WA OR OR) FOR AT LEAST 1 YEAR FROM PURCHASE DATE, FREE FROM DISEASE OR PESTS, WELL-ROOTED, BUT NOT ROOT-BOUND AND TRUE TO SPECIES.
12. PLANT LAYOUT SHALL BE APPROVED BY AOA PRIOR TO INSTALLATION AND APPROVED UPON COMPLETION OF PLANTING.
13. UPON COMPLETION OF PLANTING, ALL PLANTS SHALL BE THOROUGHLY WATERED VIA A TEMPORARY IRRIGATION SYSTEM (DESIGN-BUILT BY LANDSCAPE CONTRACTOR). SYSTEM SHALL SUPPLY 1/2" OF FLOW TWICE-WEEKLY BETWEEN JUNE 15 AND OCTOBER 15 THE FIRST YEAR OF PLANTING. FLOW SHALL BE REDUCED TO TWICE WEEKLY THE SECOND YEAR BETWEEN JULY 1 AND SEPTEMBER 30 AND ONCE WEEKLY IF DEEMED NECESSARY BY AOA THE THIRD YEAR. SYSTEM SHALL BE WINTERIZED EACH YEAR BY OCTOBER 31.
14. UPON APPROVAL OF PLANTING INSTALLATION BY AOA, THE CITY OF BELLEVUE WILL BE NOTIFIED TO CONDUCT A SITE REVIEW FOR FINAL APPROVAL OF CONSTRUCTION.
15. MAINTENANCE SHALL BE REQUIRED IN ACCORDANCE WITH THE CITY OF BELLEVUE SENSITIVE AREAS MITIGATION GUIDELINES AND APPROVED PLANS.
16. MAINTENANCE SHALL BE IMPLEMENTED ON A REGULAR BASIS ACCORDING TO THE SCHEDULE BELOW.

ANNUAL MAINTENANCE SCHEDULE

MAINTENANCE ITEM	J	F	M	A	M	J	J	A	S	O	N	D
WEED CONTROL			1		1	1	1	1	1	1		
GENERAL MAINT.			1		1	1	1	1	1	1		
WATERING - YEAR 1						4	8	8	8	4		
WATERING - YEAR 2							8	8	8			
WATERING - YEAR 3							4	4	4			

1-8 = NUMBER OF TIMES TASK SHALL BE PERFORMED PER MONTH.

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DATE 10-27-20 | REVISED

FIGURE 5: SPECIFICATIONS
STEEP SLOPE AND STREAM BUFFER MITIGATION PLAN
BROWN DIVINE
PARCEL 242405-9036
BELLEVUE, WASHINGTON

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MAINTENANCE & MONITORING PLAN

CONSTRUCTION MANAGEMENT

1. Prior to commencement of any work in the restoration areas, the mitigation areas and NGPA boundry will be staked. A pre-installation meeting will be held at the site to review and discuss all aspects of the project with the owner.
2. A biologist will supervise plan implementation during construction to ensure that objectives and specifications of the restoration plan are met.
3. Any necessary significant modifications to the design that occur as a result of unforeseen site conditions will be jointly approved by the City of Bellevue and the biologist prior to their implementation.

MONITORING METHODOLOGY

1. The monitoring program will be conducted twice yearly (in the beginning and end of the growing season) for a period of five years, with reports submitted annually (by the end of the calendar year) to the City of Bellevue.
2. Vegetation establishment within the restoration areas will be monitored during each field visit with a record kept of all plant species found.
3. Photo-points will be established from which photographs will be taken throughout the monitoring period. These photographs will document general appearance and progress in plant community establishment in the restoration areas. Review of the photos over time will provide a semi-quantitative representation of success of the restoration plan.

PERFORMANCE STANDARDS

1. Success of plant establishment within the restoration areas will be evaluated on the basis of percent survival of planted species. For woody planted species, success will be based on at least an 85% survival rate of all planted trees and shrubs or native woody recruitment by the end of the five-year monitoring period.
2. Exotic and invasive plant species will be maintained at levels below 10% total cover. Removal of these species will occur immediately following the monitoring event in which they surpass the above maximum coverage. Removal will occur by hand whenever possible.
3. In all planting areas, native woody cover will be 10% at Year 1, 15% at Year 2, 25% at Year 3, 50% at Year 4 and 60% at Year 5.

MAINTENANCE (M) & CONTINGENCY (C)

1. Invasive plant removal shall be done in March, May, July and October of each of the five years of monitoring (M).
2. Established performance standards for the project will be compared to the monitoring results in order to judge the success of the restoration project.
2. Contingency will include many of the items listed below and would be implemented if these performance standards are not met.
3. Additional maintenance and remedial action on the site will be implemented immediately upon completion of the monitoring event at the direction of AOA, (unless otherwise specifically indicated below).

- replace dead plants with the same species or a substitute species that meet the goal of the restoration plan (C)
- re-plant areas after reason for failure has been identified (e.g., moisture regime, poor plant stock, disease, shade/sun conditions, wildlife damage, etc.) (C)

PERFORMANCE BOND

1. A performance bond or other surety device will be posted with the City of Bellevue by the applicant to cover the costs of the restoration plan implementation (including labor, materials, maintenance, and monitoring).
2. The bond or assignment may be released in partial amounts in proportion to work successfully completed over the five year monitoring period, as the applicant demonstrates performance and corrective measures.

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FIGURE 6: MAINTENANCE & MONITORING PLAN
STEEP SLOPE AND STREAM BUFFER MITIGATION PLAN
BROWN DIVINE
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Earth Solutions NW LLC

Geotechnical Engineering
Construction Observation/Testing
Environmental Services

GEOTECHNICAL ENGINEERING STUDY
PROPOSED SINGLE-FAMILY RESIDENCE
17901 SOUTHEAST 60TH STREET
BELLEVUE, WASHINGTON

ES-0673.07

15365 N.E. 90th Street, Suite 100 Redmond, WA 98052
(425) 449-4704 Fax (425) 449-4711
www.earthsolutionsnw.com

PREPARED FOR

MRS. JULIE AND MR. STEVE BROWN

July 16, 2020
Updated November 5, 2020

Scott S. Riegel, L.G., L.E.G.
Senior Project Manager

11/05/2020

Raymond A. Coglas, P.E.
Principal Engineer

GEOTECHNICAL ENGINEERING STUDY
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Redmond, Washington 98052
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Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, you can benefit from a lowered exposure to problems associated with subsurface conditions at project sites and development of them that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed herein, contact your GBA-member geotechnical engineer. Active engagement in GBA exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Understand the Geotechnical-Engineering Services Provided for this Report

Geotechnical-engineering services typically include the planning, collection, interpretation, and analysis of exploratory data from widely spaced borings and/or test pits. Field data are combined with results from laboratory tests of soil and rock samples obtained from field exploration (if applicable), observations made during site reconnaissance, and historical information to form one or more models of the expected subsurface conditions beneath the site. Local geology and alterations of the site surface and subsurface by previous and proposed construction are also important considerations. Geotechnical engineers apply their engineering training, experience, and judgment to adapt the requirements of the prospective project to the subsurface model(s). Estimates are made of the subsurface conditions that will likely be exposed during construction as well as the expected performance of foundations and other structures being planned and/or affected by construction activities.

The culmination of these geotechnical-engineering services is typically a geotechnical-engineering report providing the data obtained, a discussion of the subsurface model(s), the engineering and geologic engineering assessments and analyses made, and the recommendations developed to satisfy the given requirements of the project. These reports may be titled investigations, explorations, studies, assessments, or evaluations. Regardless of the title used, the geotechnical-engineering report is an engineering interpretation of the subsurface conditions within the context of the project and does not represent a close examination, systematic inquiry, or thorough investigation of all site and subsurface conditions.

Geotechnical-Engineering Services are Performed for Specific Purposes, Persons, and Projects, and At Specific Times

Geotechnical engineers structure their services to meet the specific needs, goals, and risk management preferences of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client.

Likewise, geotechnical-engineering services are performed for a specific project and purpose. For example, it is unlikely that a geotechnical-engineering study for a refrigerated warehouse will be the same as one prepared for a parking garage; and a few borings drilled during a preliminary study to evaluate site feasibility will not be adequate to develop geotechnical design recommendations for the project.

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project or purpose;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, the reliability of a geotechnical-engineering report can be affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying the recommendations in it. A minor amount of additional testing or analysis after the passage of time – if any is required at all – could prevent major problems.

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read the report in its entirety. Do not rely on an executive summary. Do not read selective elements only. *Read and refer to the report in full.*

You Need to Inform Your Geotechnical Engineer About Change

Your geotechnical engineer considered unique, project-specific factors when developing the scope of study behind this report and developing the confirmation-dependent recommendations the report conveys. Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the elevation, configuration, location, orientation, function or weight of the proposed structure and the desired performance criteria;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project or site changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept*

responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface using various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing is performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgement to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team through project completion to obtain informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, they are not final, because the geotechnical engineer who developed them relied heavily on judgement and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* exposed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a continuing member of the design team, to:

- confer with other design-team members;
- help develop specifications;
- review pertinent elements of other design professionals' plans and specifications; and
- be available whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction-phase observations.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for information purposes only.* To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. This happens in part because soil and rock on project sites are typically heterogeneous and not manufactured materials with well-defined engineering properties like steel and concrete. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually provide environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures.* If you have not obtained your own environmental information about the project site, ask your geotechnical consultant for a recommendation on how to find environmental risk-management guidance.

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, the engineer's services were not designed, conducted, or intended to prevent migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration. Confront the risk of moisture infiltration*** by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are not building-envelope or mold specialists.***

GEOPROFESSIONAL BUSINESS ASSOCIATION

Telephone: 301/565-2733
e-mail: info@geoprofessional.org www.geoprofessional.org

Earth Solutions NW LLC
Geotechnical Engineering, Construction
Observation/Testing and Environmental Services

July 16, 2020
Updated November 5, 2020
ES-0673.07

Mrs. Julie and Mr. Steve Brown
P.O. Box 357
Snohomish, Washington 98291

Dear Mrs. and Mr. Brown:

Earth Solutions NW, LLC (ESNW) is pleased to present this in support of the proposed construction of a single-family residence in Bellevue, Washington. This updated report includes revised site plans that were recently completed. Based on the results of our study, in our opinion, construction of the proposed single-family residence is feasible from a geotechnical standpoint. In general, the subject property is generally underlain by medium dense to dense native soil deposits. The proposed structure may be supported on competent native soil or new structural fill placed directly on a competent native soil subgrade.

Geotechnical recommendations related to the proposed site development are provided in this geotechnical engineering study. If you have any questions regarding the content of this study, please call.

Sincerely,

EARTH SOLUTIONS NW, LLC

Scott S. Riegel, L.G., L.E.G.
Senior Project Manager

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ES-0673.07

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Cont'd

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GEOTECHNICAL ENGINEERING STUDY
PROPOSED SINGLE-FAMILY RESIDENCE
17901 SOUTHEAST 60TH STREET
BELLEVUE, WASHINGTON

ES-0673.07

INTRODUCTION

General

This preliminary geotechnical engineering study was prepared for the proposed single-family residence to be constructed off the south side of Southeast 60th Street on a currently vacant lot in Bellevue, Washington. The purpose of this study was to develop geotechnical recommendations for the proposed site development. Our scope of services for completing this geotechnical engineering study included the following:

- Subsurface exploration and sampling;
- Laboratory testing of soil samples;
- Engineering analysis, and;
- Preparation of this report.

The following documents and/or resources were reviewed as part of this report preparation:

- Site Plan B, prepared by Core Design, dated October 22, 2020;
- Bellevue Critical Areas Code LUC Chapter 20.25H;
- Stream Buffer Restoration Plan, prepared by Altman Oliver Associates, LLC, dated February 13, 2020;
- Buffer Mitigation Plan, prepared by Altman Oliver Associates, LLC, dated October 23, 2020;
- Geologic Map of the East Half of the Bellevue South 7.5' x 15' Quadrangle, 2012, and;
- King County USDA Soil Conservation Survey.

Project Description

We understand a single-family residence will be constructed on the parcel located along the south side of Southeast 60th Street in Bellevue, Washington. Based on review of the referenced site plan and existing topographic relief on the site, grading is anticipated to be limited to about 16 feet or less to construct the daylight basement garage. Utility line installation will likely require deeper excavations. Based on the proximity of an adjacent stream, we anticipate the new structure and associated improvements will be situated toward the eastern property boundary, which includes a public sewer easement that runs along the property line.

At the time this report was prepared, specific building load values were not available. However, we anticipate the proposed residential structure will consist of relatively lightly-loaded wood framing supported on conventional foundations. Based on our experience with similar developments, we estimate wall loads on the order of 1 to 2 kips per linear foot and slab-on-grade loading of 150 pounds per square foot (psf).

If the above design assumptions are incorrect or change, ESNW should be contacted to review the recommendations in this report, and provide supplemental recommendations.

Surface

The subject site is located along the south side of Southeast 60th Street in the Cougar Mountain area of Bellevue, Washington (Plate 1). The site consists of one L-shaped residential tax parcel (King County parcel number 2424059036) totaling approximately one acre of land area that is bordered to the south by a steep slope ascending to a residential plat, to the east and west by existing residential properties (house numbers 17811 and 17921) and to the north by Southeast 60th Street. The proposed development area is currently vacant and vegetation consists predominately of sparse trees and general ground cover. The site topography ascends to the south with about 16 percent gradient across the main portion of the lot then increasing gradients further to the south.

Subsurface

An ESNW representative observed, logged, and sampled two test pits, excavated at accessible locations within the proposed development area, on December 18, 2019, using a mini-trackhoe and operator retained by ESNW. The approximate locations of the test pits are depicted on Plate 2 (Test Pit Location Plan). Please refer to the test pit logs provided in Appendix A for a more detailed description of subsurface conditions. Representative soil samples collected at the test pit locations were evaluated in general accordance with the Unified Soil Classification System (USCS) and United States Department of Agriculture (USDA) methods and procedures.

Topsoil and Fill

Topsoil was observed extending to depths of up to 12 inches below existing grades. The topsoil thickness is variable and was characterized by dark brown color and fine organic material. Fill was encountered at test pit location TP-102 during our fieldwork. The fill consisted primarily of loose to medium dense silty sand with gravel (USCS: SM) and extended to a depth of about one and one-half feet below existing grade. Where fill is encountered during construction, ESNW should be consulted to assess the suitability for reuse as structural fill.

Native Soil

Underlying the topsoil, native soils consisting predominately of silty sand with variable gravel content (Unified Soil Classification: SM) were encountered. An isolated layer of sand (USCS: SP) was encountered at test pit location TP-101 extending from about three and one-half to six feet below existing grade, but was not encountered at the other location.

Geologic Setting

The referenced geologic map resource identifies glacial till (Qvt) across the site and surrounding areas. The referenced WSS resource identifies Beausite gravelly sandy loam (Map Unit Symbol: BeD) across the site and surrounding areas. Beausite series soils formed in glacial till over sandstone. Based on our field observations, native soils on site are generally consistent with weathered glacially consolidated deposits.

Groundwater

During our subsurface exploration completed on December 18, 2019, groundwater seepage was not encountered at the test pits locations. Groundwater seepage rates and elevations fluctuate depending on many factors, including precipitation duration and intensity, the time of year, and soil conditions. In general, groundwater flow rates are higher during the wetter, winter months.

Geologic Hazardous Areas

Based on our review of Chapter 20.25H of the Bellevue Land Use Code (LUC) and the City of Bellevue GIS online resource, the ascending slope on the south side of the subject site is classified as a steep slope hazard area and the entire site is located within a severe erosion hazard. We have included a screen shot of the GIS mapping resource including the subject parcel to this report on Plate 3. An evaluation with respect to this hazard is provided below.

Steep Slope Hazard

A steep slope hazard area is defined by LUC 20.25H.120.A as slopes of 40 percent or more that have a rise of at least 10 feet and exceed 1,000 square feet in area.

The ascending slope on the south side of the subject site meets the definition for a steep slope hazard area. The slope area is heavily vegetated with undisturbed, mature forest growth, suggesting that recent or chronic, large-scale failures have not occurred. No head scarps, debris slumps, or signs of surficial erosion were observed on the steep slope area during our reconnaissance. To the best of our knowledge, the slope is not parallel or subparallel to a plane of weakness in the subsurface material, and does not exhibit geomorphological features indicative of past large-scale failures. Utility installation has occurred along this portion of the steep slope in association with a residential plat located further to the south. This utility installation consisted of clearing vegetation, excavating to design depth, installing drainage pipes and restoring grades and surface conditions. The area of work extends down the slope through the eastern border of the subject site to connect with an existing utility within Southeast 60th Street. Based on our observations made during our fieldwork, the slope was in a stable condition at the time of our site visit. In general, it is our opinion the slope is stable in its current condition and configuration. Based on our review and investigation, it is our opinion that stability will be maintained and construction will not adversely affect the steep slope area and surrounding areas, provided our geotechnical recommendations are incorporated into final design.

Per LUC 20.25H.120.B, buffer modifications may be considered pending review and approval of a critical areas report. In our opinion, construction of the proposed residence will not increase the potential for instability on or immediately adjacent to the property provided no foundations or associated excavations encroach within 10 feet of slopes with gradients of 40 percent or greater. Minor landscaping may be performed along the steep slope but should be limited to species that promote soil retention and that are drought tolerant (that do not require irrigation). In our opinion, per BCC 20.25H.125, minor disturbance will not adversely affect the stability of the steep slope. The referenced site plan delineates two landscape walls that range in height up to about two feet (exposed) which is acceptable from a geotechnical standpoint. In any case, ESNW should review final project plans with respect to the steep slope area to confirm our geotechnical recommendations are incorporated into final design and provide supplementary recommendations, if necessary.

Erosion Hazard

The Bellevue GIS mapping resource identifies the site and immediately surrounding areas as a severe erosion hazard. The topography and soil conditions within the likely area of disturbance would present an erosion hazard; however, given the scale of this project, in our opinion, standard erosion and sediment control (ESC) BMPs will provide an adequate level of protection for adjacent properties. In addition, provided ESC BMPs are managed and maintained such that performance is as intended during construction, in our opinion, grading would not need to be seasonally restricted.

DISCUSSION AND RECOMMENDATIONS

General

Based on the results of our study, construction of the proposed residence is feasible from a geotechnical standpoint. The primary geotechnical considerations associated with the proposed development include foundation support and suitability of the on-site soils for use as structural fill.

The proposed structure may be supported on competent native soil or new structural fill placed directly on a competent native soil subgrade. We anticipate competent native and fill soil suitable for support of foundations will generally be exposed at a depth of two to four feet below exiting grades. The suitability of using the on-site soils as structural fill should be evaluated by ESNW during construction.

This study has been prepared for the exclusive use of Ms. Julie Divine, Mr. Steve Brown and their representatives. No warranty, expressed or implied, is made. This study has been prepared in a manner consistent with the level of care and skill ordinarily exercised by other members of the profession currently practicing under similar conditions in this area.

Site Preparation and Earthwork

Site preparation will likely include installing temporary erosion control measures and clearing limits and establishing a construction entrance.

Erosion Control

Temporary erosion control measures should include, at a minimum, silt fencing placed along the perimeter of the construction envelope, and a construction entrance consisting of quarry spalls, as appropriate, to minimize off-site soil tracking and to provide a firm surface. Interceptor drains or swales or other passive methods should be considered for controlling surface water flow patterns. ESNW should observe the erosion control measures and provide supplement recommendations for minimizing erosion during construction.

In-situ Soils

The soils on this site expected to be exposed during grading activities will exhibit a high sensitivity to moisture. The suitability of using the on-site soils as structural fill should be evaluated by ESNW during construction but may prove very difficult to compact to structural fill specifications if moisture is high.

Compaction of site soils to the levels necessary for use as structural fill will be difficult or impossible during wet weather conditions. If the moisture content of the soil is near the optimum level, the soil can be used as structural fill. However, the stability of the compacted soil will degrade if exposed to wet weather and/or construction traffic.

In general, soils encountered during site excavations that are excessively over the optimum moisture content will require moisture conditioning prior to placement and compaction as structural fill. Conversely, if the native soils are found to be moist or dry at the time of placement, moisture conditioning through the application of water may be necessary prior to compacting the soil.

Imported soil intended for use as structural fill within building lot areas should consist of a well graded granular soil with a maximum aggregate grain size of six inches, and a moisture content that is at or near the optimum level. During wet weather conditions, imported soil intended for use as structural fill should consist of a well graded granular soil with a fines content of 5 percent or less defined as the percent passing the #200 sieve, based on the minus three-quarter inch fraction.

Structural Fill Placement

Structural fill is defined as compacted soil placed in foundation, slab-on-grade, and roadway areas. Fills placed to construct permanent slopes and throughout retaining wall, and utility trench backfill areas are also considered structural fill. Soils placed in structural areas should be placed in loose lifts of 12 inches or less and compacted to a relative compaction of 95 percent, based on the maximum dry density as determined by the Modified Proctor Method (ASTM D-1557-02). The subgrade in pavement and slab areas must also be in a stable condition. In order to provide a stable subgrade, it may be necessary to compact more than the upper 12 inches to 95 percent.

Structural fill soils placed throughout foundation, slab, and pavement areas should be placed over a firm base devoid of organic or otherwise deleterious debris. Loose or otherwise unsuitable areas of native soil exposed at subgrade elevations should be compacted to structural fill requirements or overexcavated and replaced with a suitable structural fill material. Foundation and pervious pavement subgrade areas should be protected from disturbance, construction traffic, and excessive moisture. Where instability develops below structural fill areas, use of a woven geotextile below the structural fill areas may be required. A representative of ESNW should observe structural fill placement in foundation, slab, and pavement areas.

Subgrade Preparation

ESNW should observe the subgrade during the initial site preparation activities to confirm soil conditions and to provide supplemental recommendations for subgrade preparation, where necessary.

The proposed home site is situated near the eastern property boundary along a public sewer easement. The proposed home will include a daylight basement garage, with deepest excavations of up to about eight feet. Due to the proximity of the sewer easement, care must be taken not to disturb the existing utility line. We recommend an accurate survey be completed for the sewer line in order to determine safe excavation limits for the proposed home. ESNW should be provided information regarding the location and depth of the sewer line to determine limits of excavation for the new home.

Excavations and Slopes

The Federal and state Occupation Safety and Health Administration (OSHA/WISHA) classifies soils in terms of minimum safe slope inclinations. Based on the soil conditions encountered during our fieldwork, the fill soils, weathered native soils and where groundwater is exposed would be classified by OSHA/WISHA as Type B. Temporary slopes over four feet in height in Type B soils should be sloped no steeper than 1H:1V (Horizontal:Vertical). ESNW should observe temporary and permanent slopes to verify that the inclination is appropriate for the conditions exposed, and to provide additional grading recommendations, as necessary. If temporary slopes cannot be constructed in accordance with OSHA/WISHA guidelines, temporary shoring may be necessary. This is particularly important for stormwater facility construction.

Permanent slopes should maintain a gradient of 2H:1V, or flatter, and should be planted with vegetation to enhance stability and to minimize erosion.

Foundations

The proposed residential structure may be supported on conventional spread and continuous footings bearing on competent native soil or new structural fill placed directly on a competent native subgrade. We anticipate competent native soil suitable for support of foundations will generally be encountered at depths of two to four feet below existing grades. Where loose or unsuitable soil conditions are encountered at foundation subgrade elevations, compaction of the soils to the specifications of structural fill, or overexcavation and replacement with structural fill may be necessary. ESNW should observe the subgrade prior to setting forms or rebar to confirm conditions are as anticipated and to provide supplement recommendations.

Provided the foundations are prepared as described above, following parameters can be used for design:

- Allowable soil bearing capacity 2,500 psf
- Passive earth pressure 300 pcf
- Coefficient of friction 0.40

The passive earth pressure value provided above assumes the foundations are backfilled with structural fill. A factor-of-safety of 1.5 has been applied to these passive resistance and friction values. For short term wind and seismic loading, a one-third increase in the allowable soil bearing capacity can be assumed.

With structural loading as expected, total settlement in the range of one inch is anticipated, with differential settlement of approximately one-half inch. The majority of the settlements should occur during construction, as dead loads are applied.

Foundation Setbacks

In our opinion, construction of the proposed residence will not increase the potential for instability on or immediately adjacent to the property provided no foundations or associated excavations encroach within 10 feet of slopes with gradients of 40 percent or greater. Minor landscaping may be performed along the steep slope but should be limited to species that promote soil retention and that are drought tolerant (that do not require irrigation).

Slab-On-Grade Floors

Slab-on-grade floors should be supported on competent native soil or structural fill. Unstable or yielding areas of the subgrade should be recompacted or overexcavated and replaced with suitable structural fill prior to construction of the slab. A capillary break consisting of a minimum of four inches of free draining (clean) crushed rock or gravel should be placed below the slab. The free draining material should have a fines content of 5 percent or less (percent passing the #200 sieve, based on the minus three-quarter inch fraction). In areas where slab moisture is undesirable, installation of a vapor barrier below the slab should be considered. If a vapor barrier is used it should consist of a material specifically designed for that use and be installed in accordance with the manufacturer's specifications.

Seismic Considerations

The 2015 IBC recognizes ASCE for seismic site class definitions. If the project will be permitted under the 2015 IBC, in accordance with Table 20.3-1 of ASCE, Minimum Design Loads for Buildings and Other Structures, Site Class D, should be used for design.

In our opinion, liquefaction susceptibility at this site is very low. The relative density and composition of the site soils and the absence of a uniform, shallow groundwater table is the primary basis for this designation.

Retaining Walls

Retaining walls should be designed to resist earth pressures and any applicable surcharge loads. For design, the following preliminary parameters can be considered for concrete retaining wall design using soil backfill:

- Active earth pressure (yielding condition) — 35 pcf (equivalent fluid)
- At-rest earth pressure (restrained condition) — 55 pcf
- Traffic surcharge (passenger vehicles) — 70 psf (rectangular distribution)
- Passive earth pressure — 350 pcf (equivalent fluid)
- Coefficient of friction — 0.40
- Lateral seismic surcharge — 6H*

** Height of retaining wall in feet where walls are at least six feet in height.*

Additional surcharge loading from foundations, sloped backfill, or other loading should be included in the retaining wall design, where applicable.

Retaining walls should be backfilled with free draining material that extends along the height of the wall, and a distance of at least 18 inches behind the wall. The upper one foot of the wall backfill can consist of a less permeable soil, if desired. A typical retaining wall drainage detail is provided on Plate 4.

Utility Support and Trench Backfill

In our opinion, the soils observed at the test sites are generally suitable for support of utilities. Loose, organic, or otherwise unsuitable soils encountered in the trench excavations should not be used for supporting utilities. The on-site soils observed at the majority of the test sites may be suitable for use as structural backfill in the utility trench excavations provided the soil is at or near the optimum moisture content at the time of placement and compaction and devoid of organics or deleterious debris. Moisture conditioning of the soils may be necessary at some locations prior to use as structural fill. Utility trench backfill should be placed and compacted to the specifications of structural fill provided in this report, or to the applicable specifications of City of Bellevue regulations.

Drainage

Groundwater seepage was not observed in the test pit explorations during our fieldwork (December 2019). Due to the limited grading anticipated to be required, temporary measures to control groundwater seepage and surface water runoff during construction will likely involve passive measures such as interceptor trenches and sumps areas.

In our opinion, perimeter drains should be installed at or below the bottom of the building footings. A footing drainage detail is provided on Plate 5.

Infiltration

The soils encountered at the test pit locations consist primarily of medium dense to dense, silty sand with gravel glacial till deposits. Using the USDA soil classification scheme, the soils underlying the site consist predominately of loam with fines contents generally of 18 percent. This soil type is not well-suited for full infiltration due to the very low permeability. While there was a layer of relatively clean sand (SP) encountered at test pit location TP-102, this layer was thin and isolated; therefore, in our opinion is not suitable for infiltration.

LIMITATIONS

The recommendations and conclusions provided in this geotechnical engineering study are professional opinions consistent with the level of care and skill that is typical of other members in the profession currently practicing under similar conditions in this area. A warranty is not expressed or implied. Variations in the soil and groundwater conditions observed at the test sites may exist, and may not become evident until construction. ESNW should reevaluate the conclusions in this geotechnical engineering study if variations are encountered.

Additional Services

ESNW should review the final design with respect to the geotechnical recommendations provided in this report. ESNW should also be retained to provide testing and consultation services during construction.

Reference:
King County, Washington
OpenStreetMap.org

NORTH

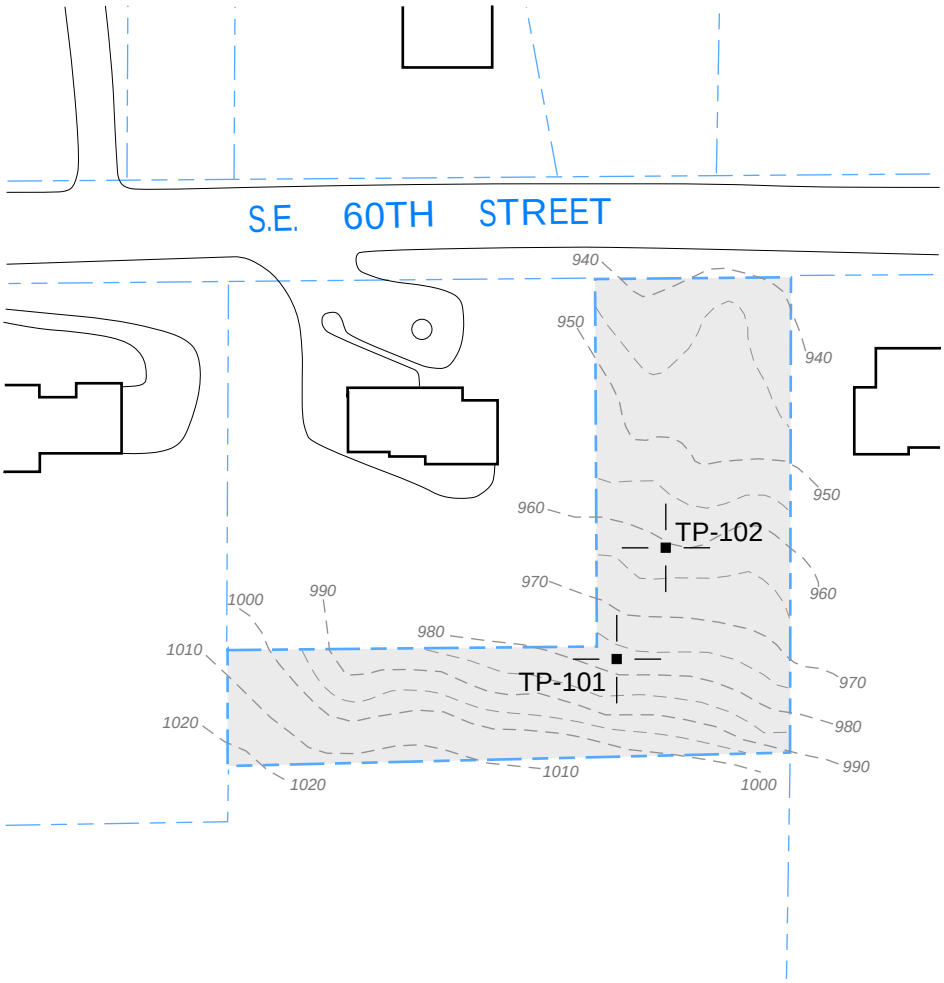
NOTE: This plate may contain areas of color. ESNW cannot be responsible for any subsequent misinterpretation of the information resulting from black & white reproductions of this plate.

Earth Solutions NW LLC

Geotechnical Engineering, Construction Observation/Testing and Environmental Services

Vicinity Map
S.E. 60th Street SFR
Bellevue, Washington

Drwn. MRS	Date 01/16/2020	Proj. No. 0673.07
Checked CGH	Date Jan. 2020	Plate 1



LEGEND

TP-101 — Approximate Location of ESNW Test Pit, Proj. No. ES-0673.07, Dec. 2019

Subject Site

Existing Building

NORTH

NOT - TO - SCALE

NOTE: The graphics shown on this plate are not intended for design purposes or precise scale measurements, but only to illustrate the approximate test locations relative to the approximate locations of existing and / or proposed site features. The information illustrated is largely based on data provided by the client at the time of our study. ESNW cannot be responsible for subsequent design changes or interpretation of the data by others.

NOTE: This plate may contain areas of color. ESNW cannot be responsible for any subsequent misinterpretation of the information resulting from black & white reproductions of this plate.

Earth Solutions NW LLC

Geotechnical Engineering, Construction Observation/Testing and Environmental Services

Test Pit Location Plan
S.E. 60th Street SFR
Bellevue, Washington

Drwn. MRS	Date 02/11/2020	Proj. No. 0673.07
Checked CGH	Date Feb. 2020	Plate 2

A geologic hazard is an extreme natural event in the crust of the earth that pose a threat to life and property, for example, earthquakes, volcanic eruptions, tsunamis (tidal waves) and landslides.

Critical Geologic Hazards

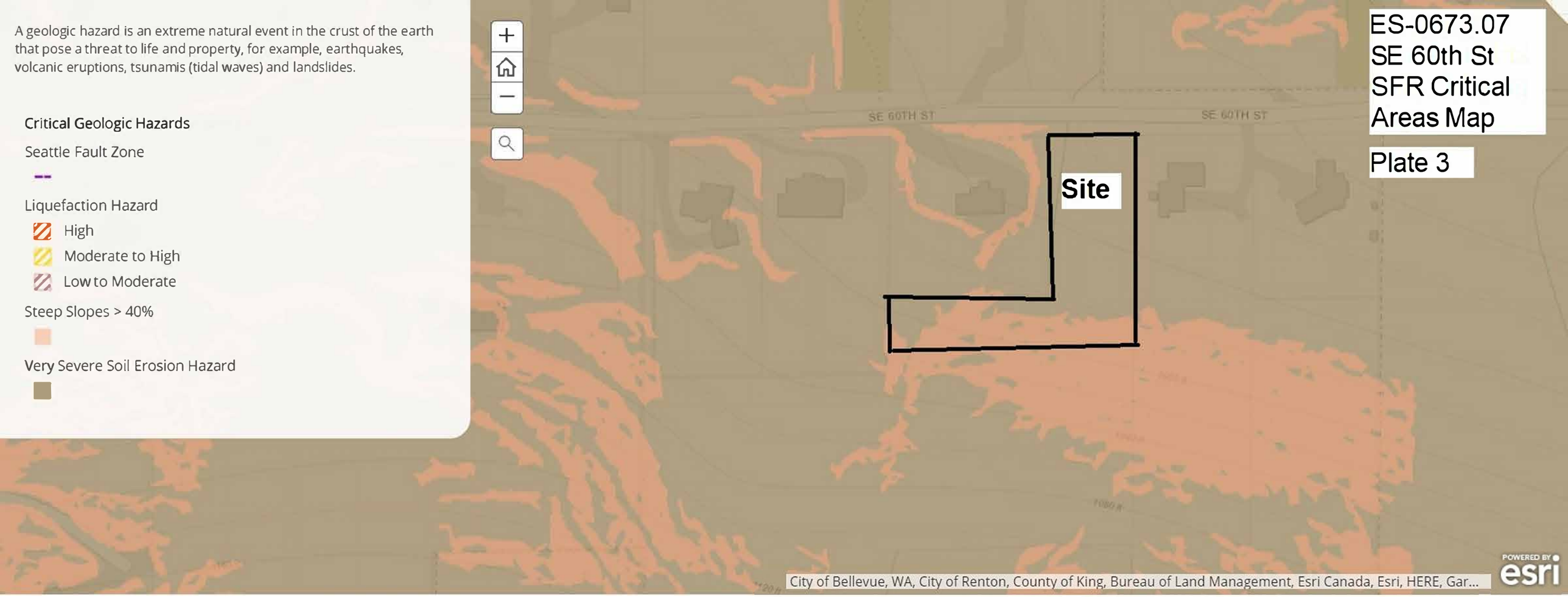
Seattle Fault Zone

Liquefaction Hazard

- High
- Moderate to High
- Low to Moderate

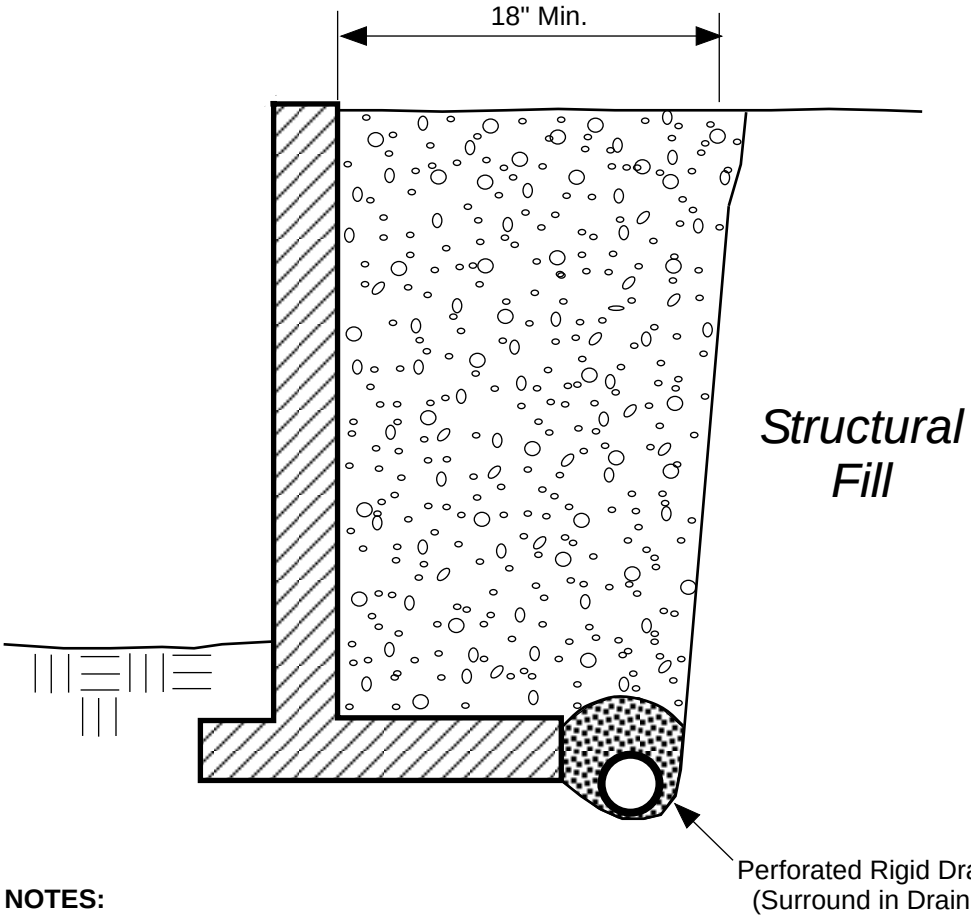
Steep Slopes > 40%

Very Severe Soil Erosion Hazard



ES-0673.07
SE 60th St
SFR Critical Areas Map

Plate 3



NOTES:

- Free-draining Backfill should consist of soil having less than 5 percent fines. Percent passing No. 4 sieve should be 25 to 75 percent.
- Sheet Drain may be feasible in lieu of Free-draining Backfill, per ESNW recommendations.
- Drain Pipe should consist of perforated, rigid PVC Pipe surrounded with 1-inch Drain Rock.

SCHEMATIC ONLY - NOT TO SCALE
NOT A CONSTRUCTION DRAWING

LEGEND:

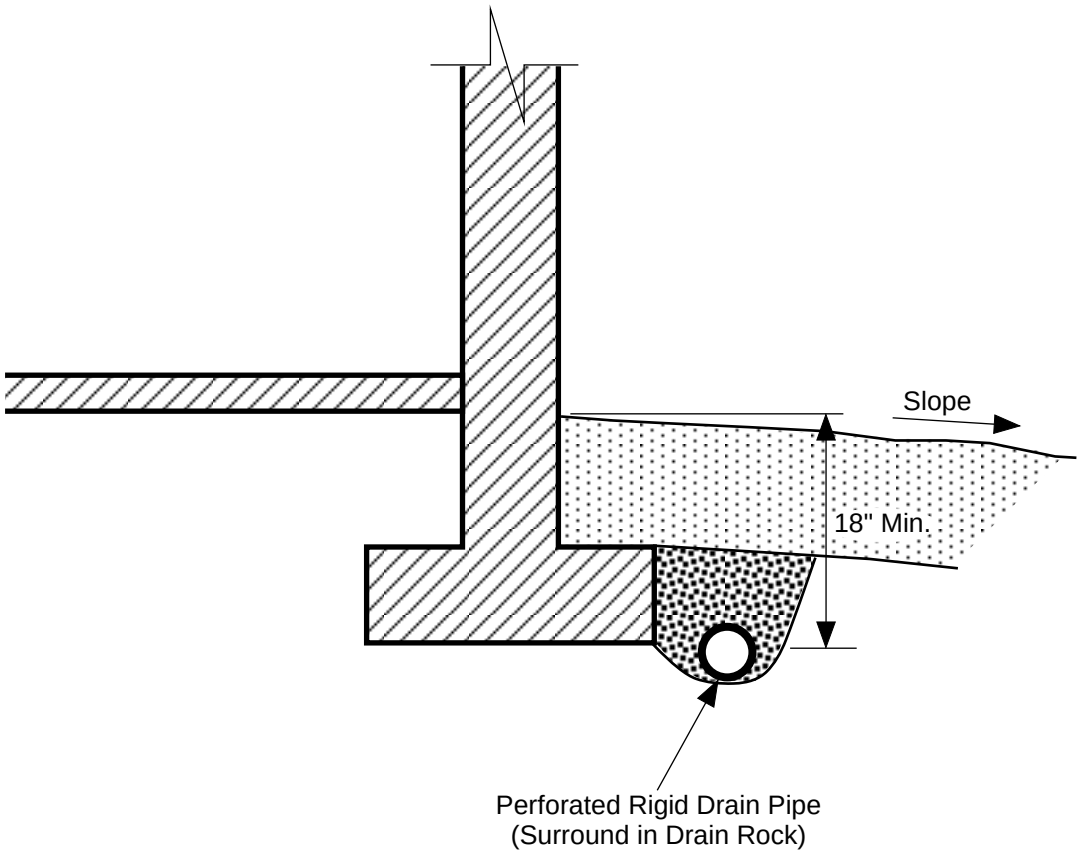
Free-draining Structural Backfill

1-inch Drain Rock

Earth Solutions NW LLC
Geotechnical Engineering, Construction Observation/Testing and Environmental Services

Retaining Wall Drainage Detail
S.E. 60th Street SFR
Bellevue, Washington

Drwn. MRS	Date 02/06/2020	Proj. No. 0673.07
Checked CGH	Date Feb. 2020	Plate 4



NOTES:

- Do NOT tie roof downspouts to Footing Drain.
- Surface Seal to consist of 12" of less permeable, suitable soil. Slope away from building.

SCHEMATIC ONLY - NOT TO SCALE
NOT A CONSTRUCTION DRAWING

LEGEND:

Surface Seal: native soil or other low-permeability material.

1-inch Drain Rock

Earth Solutions NW LLC
Geotechnical Engineering, Construction Observation/Testing and Environmental Services

Footing Drain Detail
S.E. 60th Street SFR
Bellevue, Washington

Drwn. MRS	Date 02/06/2020	Proj. No. 0673.07
Checked CGH	Date Feb. 2020	Plate 5

Appendix A

Subsurface Exploration
Test Pit Logs

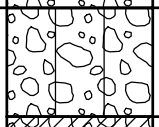
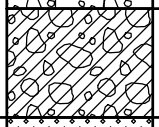
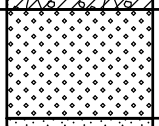
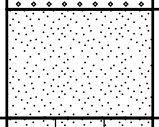
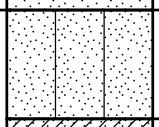
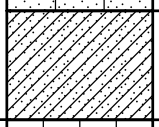
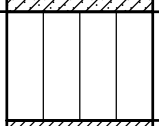
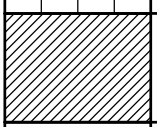
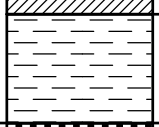
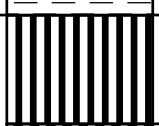
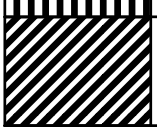
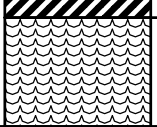
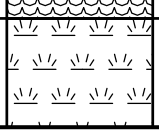
ES-0673.07

The subsurface conditions at the site were explored by excavating two test pits at the approximate locations illustrated on Plate 2. The test pit logs are provided in this Appendix. The subsurface exploration was completed on December 18, 2019.

The final logs represent the interpretations of the field logs and the results of laboratory analyses. The stratification lines on the logs represent the approximate boundaries between soil types. In actuality, the transitions may be more gradual.

Earth Solutions NW LLC

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

DUAL SYMBOLS are used to indicate borderline soil classifications.

The discussion in the text of this report is necessary for a proper understanding of the nature of the material presented in the attached logs.

Earth Solutions NW, LLC
15365 N.E. 90th Street, Suite 100
Redmond, Washington 98052
Telephone: 425-449-4704
Fax: 425-449-4711

TEST PIT NUMBER TP-101

PROJECT NUMBER ES-0673.07 **PROJECT NAME** S.E. 60th Street SFR

DATE STARTED 12/18/19 **COMPLETED** 12/18/19 **GROUND ELEVATION** 980 ft **TEST PIT SIZE**

EXCAVATION CONTRACTOR NW Excavating **GROUND WATER LEVELS:**

EXCAVATION METHOD **AT TIME OF EXCAVATION** ---

LOGGED BY CGH **CHECKED BY** SSR **AT END OF EXCAVATION** ---

NOTES Depth of Topsoil & Sod 12": brush **AFTER EXCAVATION** ---

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	
0			TPSL		Dark brown TOPSOIL, root intrusions to 4'	
				1.0		979.0
		MC = 15.90% Fines = 17.80%	SM		Tan silty SAND, medium dense, moist [USDA Classification: slightly gravelly loamy SAND]	
				3.5		976.5
		MC = 8.50% Fines = 2.90%	SP		Tan poorly graded SAND, medium dense, moist [USDA Classification: very gravelly coarse SAND]	
5				6.0		974.0
		MC = 11.90%	SM		Gray silty SAND, dense, moist to wet	
		MC = 24.00%		7.5		972.5
					Test pit terminated at 7.5 feet below existing grade. No groundwater encountered during excavation. No caving observed.	

Earth Solutions NW, LLC
15365 N.E. 90th Street, Suite 100
Redmond, Washington 98052
Telephone: 425-449-4704
Fax: 425-449-4711

TEST PIT NUMBER TP-102

PROJECT NUMBER ES-0673.07 **PROJECT NAME** S.E. 60th Street SFR

DATE STARTED 12/18/19 **COMPLETED** 12/18/19 **GROUND ELEVATION** 960 ft **TEST PIT SIZE**

EXCAVATION CONTRACTOR NW Excavating **GROUND WATER LEVELS:**

EXCAVATION METHOD **AT TIME OF EXCAVATION** ---

LOGGED BY CGH **CHECKED BY** SSR **AT END OF EXCAVATION** ---

NOTES Surface Conditions: grass **AFTER EXCAVATION** ---

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	
0			SM		Brown to gray silty SAND with gravel, loose to medium dense, moist (Fill)	
					1.5	958.5
			TPSL		Relic TOPSOIL Horizon	
					2.0	958.0
		MC = 21.60%	SM		Brown silty SAND with gravel, medium dense, moist	
5					-becomes gray, dense	
		MC = 17.40% Fines = 27.40%			[USDA Classification: gravelly sandy LOAM]	
					7.0	953.0

Test pit terminated at 7.0 feet below existing grade. Test pit shifted East about 3.0 feet due to rock obstruction ~4' bgs. Moderate perched groundwater seepage in original test pit at ~4', not encountered when shifted. No caving observed.

Appendix B

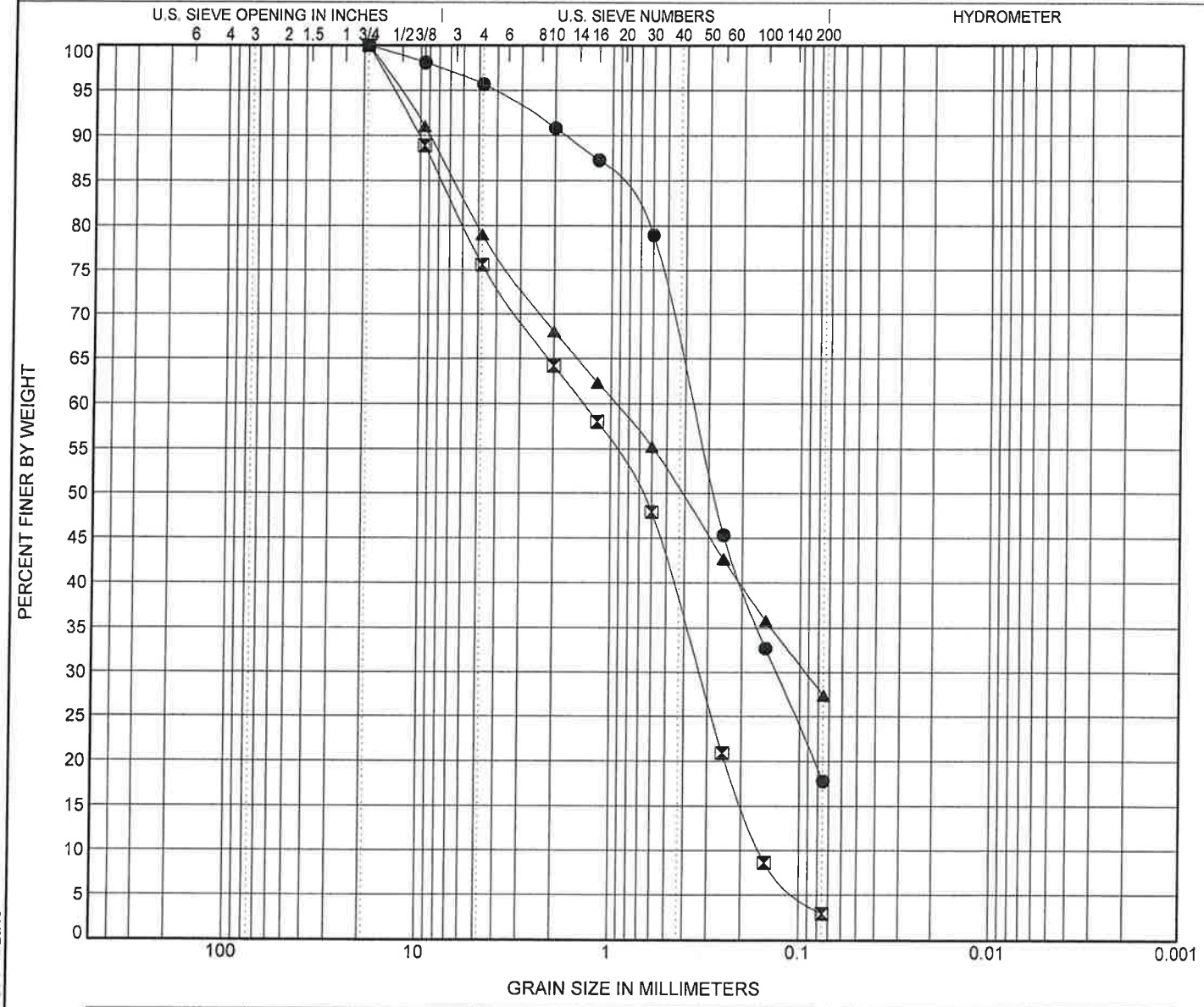
Laboratory Test Results

ES-0673.07

Earth Solutions NW, LLC
15365 N.E. 90th Street, Suite 100
Redmond, Washington 98052
Telephone: 425-449-4704
Fax: 425-449-4711

GRAIN SIZE DISTRIBUTION

PROJECT NUMBER ES-0673.07 **PROJECT NAME** SE 60th Street SFR



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification		Classification	Cc	Cu
● TP-101	2.00ft.	USDA: Tan Slightly Gravelly Loamy Sand. USCS: SM.		
⊠ TP-101	4.00ft.	USDA: Tan Very Gravelly Coarse Sand. USCS: SP with Gravel.	0.51	8.81
▲ TP-102	7.00ft.	USDA: Gray Gravelly Sandy Loam. USCS: SM with Gravel.		

Specimen Identification		D100	D60	D30	D10	LL	PL	PI	%Silt	%Clay
● TP-101	2.0ft.	19	0.366	0.132					17.8	
⊠ TP-101	4.0ft.	19	1.396	0.336	0.159				2.9	
▲ TP-102	7.0ft.	19	0.944	0.093					27.4	

Report Distribution

ES-0673.07

EMAIL ONLY

Mrs. Julie and Mr. Steve Brown
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Snohomish, Washington 98291

EMAIL ONLY

Core Design, Inc.
12100 Northeast 195th Street, Suite 300
Bothell, Washington 98011

Attention: Mr. Craig J. Krueger